LGBTQ Inclusion in Educator Preparation:
Getting Ready for Gender and Sexual Diversity in Secondary School Settings

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Dedication

This thesis is dedicated to all the students in public school classrooms who insist daily that they deserve to see their lives reflected in the curriculum. Your resistance to the formal exclusion of your beauty, value, and worth makes it better for all of us.

This work is also dedicated to all the teachers who push the boundaries of public education in the pursuit of making space for all people to be welcomed, safe, and fully themselves in school.

Abstract

While many lesbian, gay, bisexual, transgender, and queer (LGBTQ) students are able to resiliently navigate their public school education many others experience harsh school climates and negative health and educational outcomes. Harassment and bullying of LGBTQ students in school environments have been linked to numerous negative psychological and academic outcomes for students diverse in sexual orientation and/or gender identity. Preparing teacher candidates (TCs) to respond effectively to harassment and bullying of students and to create inclusive curriculum has been recommended to improve outcomes for students. Yet the development of these teaching practices has not been pursued broadly in educator preparation programs (EPPs) or specifically in science EPPs (SEPPs). This dissertation broadens the notion of diversity traditionally attended to in EPPs through three studies.

The first study is a holistic single-case study of an LGBTQ-inclusive EPP. It focused on the following three research questions: What were the contextual features that surrounded the LGBTQ-inclusive EPP? What were the specific elements of LGBTQ inclusion in the EPP? And, what were the strengths and weaknesses of the LGBTQ-inclusive EPP? This study drew primarily from data collected from interviews with faculty and administrators in a large post-baccalaureate 5th year preparation for licensure program. Document analysis was used to triangulate and expand upon the data collected during the interviews. A framework for analyzing LGBTQ inclusion across the components of an EPP was developed as part of this study. This study has direct

implications for the particular EPP, but also clarifies research needs around LGBTQ inclusion in secondary EPPs.

While little has research exists about LGBTQ inclusion in EPPs, far less has been attempted and understood in the discipline of secondary life science. The second study thus narrows its focus from the particulars of LGBTQ inclusion in an EPP to the possibilities for LGBTQ inclusion in life science educator preparation. This study, thus, is theoretical as it sets about exploring possibilities for LGBTQ inclusion across life science education curriculum by drawing from the literature about the needs of LGBT and questioning students, the small amount of scholarly work related to science teacher education, and other scholarly work that relates to preparing teachers for gender and sexual diversity in secondary settings.

The second study explored possibilities for LGBTQ inclusion in science teacher education. The third study, a holistic multiple-case study, explored science teacher candidates' adoption of LGBTQ inclusion in their praxis during a science EPP (SEPP). The research questions guiding this study were: what were science TCs' commitments to LGBTQ-inclusive praxis? What were science TCs' enactments of LGBTQ-inclusive praxis? And, what supports and barriers influenced TCs' commitment to and enactment of LGBTQ-inclusive praxis during the SEPP? Understanding these commitments, enactments, and the supports and barriers to them will benefit the particular SEPP and contribute to greater understanding of the capacities and needs of science TCs as they are challenged to fully welcome and educate the diversity of learners who enter their classrooms.

The set of studies concludes with a discussion of implications for EPPs and future research that may lead to the realization of a vision of classroom practices that are inclusive of LGBTQ students for the benefit of schools and communities.

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Chapter 1: Introducing LGBTQ Inclusion in Educator Preparation

I did not enroll in an education doctoral program for the purpose of speaking to science teacher educators about preparing science teacher candidates (TCs) to create inclusive classroom practices for lesbian, gay, bisexual, transgender, and queer (LGBTQ[1]) students, their families, and communities. I recently reviewed my application to the program and was surprised to see my own words, "in anticipation of the new requirements for engineering in the MN State Standards, I would like to conduct research on how teachers and districts respond to changing science standards in their instruction and curriculum selection. This study would involve surveys, classroom observation, and correlation of data to existing Minnesota Department of Education financial and achievement data." In fairness, there was also some hint of the path I ultimately took as I wrote in the program's required diversity statement, "I am queer. I have experienced discrimination and unfounded hatred. My family and personal life is something I have learned, out of necessity, to keep a bit guarded in professional situations. However, the stigma and difficulty my family has experienced has also inspired me to contribute to increasing understanding in the community."

My research path was changed when, in a required class for my curriculum and instruction degree, I was moved to learn more about how science curriculum integrated

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[1] There are many other identities that represent gender and sexual diversity, including intersex, gender asexual, gender queer, and transsexual. Though it is an oversimplification, I chose the umbrella of "LGBTQ" for this analysis due to theoretical frames in existing research in this area. I utilized the terminology of others when citing their work. "LGBT" for lesbian, gay, bisexual, and transgender is the most common other usage in this thesis.

topics related to human diversity of sexual orientation eventually leading me to read *The 2009 National School Climate Survey: The Experiences of Lesbian, Gay, Bisexual and Transgender Youth in Our Nation's Schools* published by the Gay, Lesbian, and Straight Education Network (GLSEN). I was quite frankly alarmed by the data. Their work revealed that 30.0% of LGBT students surveyed had skipped at least an entire day of school in the month prior to the survey because they felt unsafe or uncomfortable at school (Kosciw, Greytak, Diaz, & Bartkiewicz, 2010). This rate was more than four times that of the general population (30.0% *vs*. 6.7%). Additionally, the researchers found that, "the incidence of in-school victimization experienced by LGBT students hinders their academic success and educational aspirations" (p. xvii). Finally, "in-school experiences of harassment and assault were related to poorer psychological well-being" (p. xvii). Specifically, those whom experienced higher levels of victimization had higher levels of depression and anxiety when compared to those whom reported lower levels of victimization. Meanwhile, national awareness seemed to be growing related to the increased incidence of suicide among LGBT-identified and questioning youth.

I never lost interest in the "main work" of preparing TCs for their practice. That is, I work to ensure that my candidates are prepared for planning, executing, and assessing high quality learning opportunities that stimulate deep inquiry, critical reflection, and the generation of opportunities for all learners who step through their doors no matter where they fall on any of the various axis of human diversity. However, I realized that special care was needed in regards to interrupting the role of teachers, and

life science teachers in particular, in reinforcing simplified status quo understandings about gender and sexual diversity through their practice.

All That Glitters: Reigning in Terms

Gay, queer, GLBT, LGBT, LGBTQI, LGBTQQI, GLBTQ, FABGLITTER, GSW, and so forth have all been used effectively by professionals, activists, and individuals in regards to their work and their own personal identity. The reason for each of these unique presentations is highly contested and I am choosing to refrain from detailing the neither specific meaning nor contextual appropriateness of each of these terms. The switch from GLBT to LGBT, for instance, was largely motivated by feminist desires to forward the advocacy of lesbians in what had previously been called the "gay rights movement." The inclusion of bisexual and transgender identities occurred in the 1990s, though, many would argue those populations have remained an afterthought. The "Q" in the acronyms sometimes means queer and other times means questioning.

The language here is very fluid. This dissertation, though, is not intended to be a linguistic exercise. I debated at length about which acronym or term to use in this work with "LGBT," "LGBTQ" (Q here for queer), and "queer" leading in my consideration. I ultimately decided to align my terminology with that used by Elia and Eliason (2010) due to the role their framework for LGBTQ inclusion took in developing my own thinking and analysis. It is commonly used in the literature, but many of the resources I draw from have selected other terms for very good reasons. When referencing the work of others, I have referred to the population which they defined. When referring to the sexual

orientation of individuals within my work, I use the term they personally use to identify themselves.

I wish to clarify that there are differences between students' behaviors, identities, and labels in regards to sexual orientation and gender expression which teachers may find helpful. Behaviors are what students actually do with their bodies. Identities are the complicated perceptions of self that a student develops as they experience the world socioculturally. Finally, labels are applied to students based on oversimplified groupings of people for the purposes of evaluation and research (see Figure 1.1). There are correlations between identities and actual sexual behaviors, but they are not absolute. Knowledge of the specific anatomy and sexual behaviors of individuals is not relevant to the work of classroom teachers. Labels are important for teachers to consider as they and others evaluate their own teaching to ensure that there is not an opportunity or learning gap between different groups of students. At this time teachers may evaluate such gaps between groupings of their students based on student characteristics including gender, ethnicity, class, home language, qualification for special education services, and/or enrollment in free and reduced lunch services, but very few schools are presently collecting student demographic information about sexual orientation and/or gender expression. Thus, at this time, classroom teachers should largely be concerned about the identities of their students in shaping their curriculum.

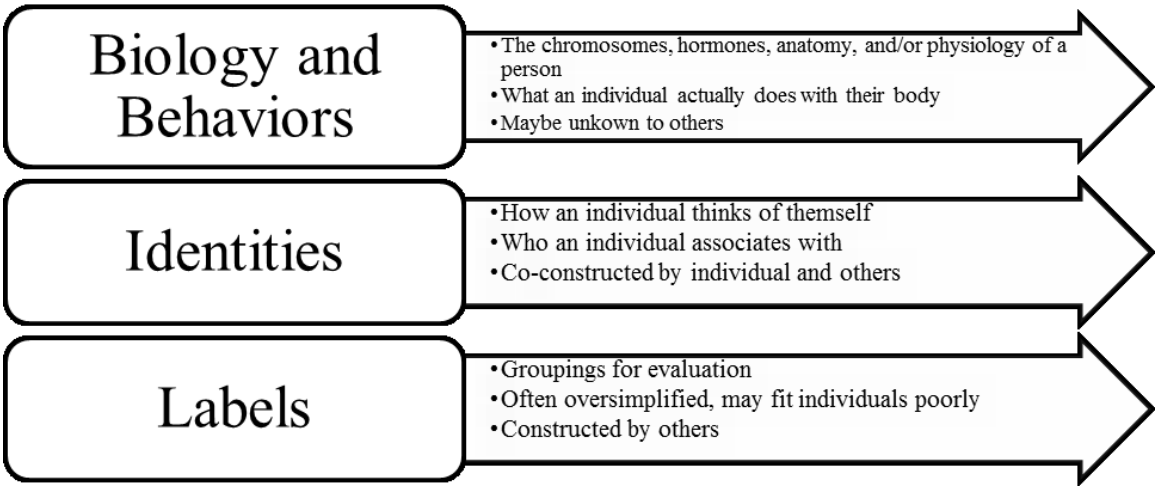

Figure 1.1. Sexual Orientation and Gender Expression: Biology and Behaviors, Identities, and Labels. Confusion may occur around sexual orientation and gender expression when individuals do not recognize the difference between a person's biology and behaviors, their identities, and labels.

My thesis focuses on preparing TCs for their work with students who will have identities in terms of their gender and sexualities that will impact the learning that occurs in their classrooms. My thesis seeks to build upon the research base that works around these identities as they apply to large numbers of people and thus addresses gender and sexual diversity at the level of labels. Thus, I refer to "LGBTQ-identified" people and "LGBTQ inclusion."

Pilot Study

In the year prior to this study I piloted small changes to the science educator preparation program (SEPP) with the support of the science methods instructor. This pilot was essentially a "one day, one shot" intervention, the effectiveness of which is questionable (Meyer, 2010). I prepared for this lesson by writing a candidate whom I knew to be an ally asking about the experiences the candidates had during the SEPP related to LGBT[2] topics. She responded that there had hardly been any. I structured the lesson with the assumption that some of the candidates might not have any vocabulary or understanding about LGBT-identified people.

The lesson began as Sadowski (2010) recommended with a focus on the science TC's core educational values. As recommended, I provided an opportunity for the TCs to contrast those ideas to the realities LGBT students face in schools through a jigsaw reading of the *Rolling Stone* article, "One Town's War on Gay Teens" (2012). This article includes numerous very intense passages including the following:

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[2] I had not yet encountered the framework from Elia and Eliason (2010).

> The silence of adults was deafening. At Blaine High School, says alum Justin Anderson, “I would hear people calling people ‘fags’ all the time without it being addressed. Teachers just didn't respond." In Andover High School, when 10th-grader Sam Pinilla was pushed to the ground by three kids calling him a “faggot,” he saw a teacher nearby who did nothing to stop the assault. At Anoka High School, a 10th-grade girl became so upset at being mocked as a “lesbo” and a “sinner” – in earshot of teachers – that she complained to an associate principal, who counseled her to “lay low”; the girl would later attempt suicide. At Anoka Middle School for the Arts, after Kyle Rooker was urinated upon from above in a boys' bathroom stall, an associate principal told him, “It was probably water.” Jackson Middle School seventh-grader Dylon Frei was passed notes saying, “Get out of this town, fag”; when a teacher intercepted one such note, she simply threw it away.

The original full text as cut for the jigsaw is included in Appendix A. The candidates paired up with other candidates who had read other pieces of the article to discuss the text.

I called the TCs back together for a short whole group discussion. Several candidates verbalized being perturbed by the reading expressing sadness and shock. Some had already read the article. I could not read all of the candidates’ responses as some sat silently with rather flat expressions. I presented data from GLSEN’s 2010 school climate survey and data from Robinson and Espelage (2011). I followed this with GLSEN’s recommendations for schools focusing candidates’ attention on LGBT-

inclusive teaching practices and how rarely students in science classrooms experience this effective intervention. I asked the TCs to form small groups and discuss what LGBT-inclusive teaching practices might look like in their science classrooms. The life science teachers had several ideas including addressing how gender/sex is taught in genetics units. The physical science teachers struggled and turned to me for suggestions though I had few to offer other than avoiding "boy and girl" themed practice problems, representing the lives of non-straight scientists more fully, and establishing a respectful classroom culture in which harassment was not tolerated.

I asked the candidates to complete three statements before they left class as part of an exit survey. They were not asked to include their names. The prompts were: "two things I learned in class today…"; "In class today I felt…"; and, "I need to know/learn…" The responses to these prompts were enlightening in their breadth. For instance, a candidate indicated learning something rather simple: "LGBT = GLBT (you can flip the G and L)" while another had learned something seemingly more sophisticated: "ways to provide a better environment for fostering a healthy environment for GLBT students to be more comfortable." Similarly, the lesson was experienced in very different ways by the candidates ranging from: "a little uncomfortable at times because I have very strong beliefs and I was worried I might express them in a way that offended others or made others uncomfortable. I often stick my foot in my mouth so I have learned to be cautious around touchy subjects," to: "empowered to do more as an advocate for LGBT students." The candidates almost universally expressed a need to know and learn a great deal more. This desire for more learning included greater

scientific understanding, “more about the science, biology, biotechnology, and chemistry of being GLBTQ so I can teach about it explicitly.” Though, it also became clear to me that the candidates were struggling with the larger issue of harassment in schools as one candidate commented at length:

> How to deal with bullying. I have no idea how to approach this and I feel that it's a very important topic but I feel that I have continually been told that this cannot be taught I will have to learn it on the job but I would really appreciate some role playing of both common and uncommon examples and different responses (a few good, a few not so good) I think more direct experience would really improve my comfort level which would improve my effectiveness.

This lack of knowledge and experience extended to awareness for some that they needed greater familiarity with school district policies and more support understanding them. All of the data from the exit survey is compiled in Appendix B.

The TCs were asked to reflect further on what they could do and what they would need assistance with in a reflection assignment that was shared publically in the cohort’s on-line forum. Many candidates took clear, strong positions about their desire to be an ally to LGBT students. A support many indicated needing to translate their commitment into practice was clear district policies against bullying and supportive of LGBT inclusive classrooms. There were a small number of candidates who did not respond to the assignment, but that was not uncommon. This journal reflection had approximately the same number of views as the assignment prior and far fewer than the reflection directly

following it. This difference was likely due to the requirement that candidates comment on their colleagues posting on the later reflection.

The pilot study clarified the potential of even small, short efforts to explicitly include LGBT-identified people and topics in initial license programs. It was evident to me that the TCs had varying amounts of prior learning (substantially from outside of their teacher education), desired information, and benefited from having conversations about the role of teachers in advocating for diverse students. The topics, concerns, and emotions expressed all helped me clarify my thinking about the potential of a fully LGBT-inclusive teacher education program and solidified the topic for this dissertation.

Goals, Objectives, Designs, and Methods

This dissertation includes three separate studies about LGBTQ inclusion in educator preparation programs (EPPs). Each of these studies was guided by unique research questions. The nature of the research questions themselves required the use of somewhat different research methodologies. They are all centered on the transformative goal of realizing LGBTQ-inclusive educator preparation. The research goals, objectives, designs, and methods for each of the three studies are described in this section.

Study One

The first study is a holistic single-case study of an LGBTQ-inclusive EPP. It focused on the following three research questions: what were the contextual features that affected the LGBTQ-inclusive EPP? What were the specific elements of LGBTQ inclusion in the EPP? And, what were the strengths and weaknesses of the LGBTQ-inclusive EPP? This study drew primarily from data collected from interviews with

faculty and administrators in a large post-baccalaureate 5th year preparation for licensure program. Document analysis was used to triangulate and expand upon the data collected during the interviews. A framework for analyzing LGBTQ inclusion across the components of an EPP was developed as part of this study. This study has direct implications for the particular EPP, but also clarifies research needs around LGBTQ inclusion in secondary EPPs.

Study Two

Research on preparation programs found that 60% of secondary programs include sexual-orientation content (Sherwin & Jennings, 2006). Among those that did address sexual orientation, coverage was more likely to occur in foundations of education courses than methods courses, 90.3% compared to 30.8%. No study presently indicates what percentage of science methods courses may be addressing sexual orientation. Study two thus narrows its focus from the particulars of LGBTQ inclusion in EPPs to the possibilities for LGBTQ inclusion in science teacher education. This study is theoretical as it sets about exploring a possible curriculum by drawing from the literature about the needs of LGBT and questioning students (e.g., Kosciw, *et al.*, 2010; Kosciw, *et al.*, 2012; Robinson & Espelage, 2011, 2012), scholarly work related to LGBTQ inclusion in science teaching (e.g., Fifield & Swain, 2002; Kumashiro, 2004), and other scholarly work that relates to preparing teachers for gender and sexual diversity in secondary settings (e.g., Meyer, 2010; Quin & Meiners, 2011).

Study Three

While the second study explored possibilities for LGBTQ inclusion in science teacher education, the third study explored science TCs' adoption of LGBTQ inclusion in their praxis as result of LGBTQ-inclusive practices within their SEPP. This holistic multiple-case study (Yin, 2009) closely examined the experiences of science TCs enrolled in a science EPP (SEPP). The research questions guiding this study were: what were science TCs' commitments to LGBTQ-inclusive praxis? What were science TCs' enactments of LGBTQ-inclusive praxis? And, what supports and barriers influenced TCs' commitment to and enactment of LGBTQ-inclusive praxis within the SEPP? Understanding these commitments, enactments, and the supports and barriers to them will benefit the particular SEPP and contribute to greater understanding of the capacities and needs of science TCs as they are challenged to fully welcome and educate the diversity of learners who enter their classrooms.

Potential Contributions

The LGBTQ-inclusive EPP and SEPP described in the two empirical studies were complex sociological phenomenon which occurred at one time, in one place, and were likely affected by being the focal point of study for this dissertation. The experiences of the candidates and instructors will never be exactly replicated in their institutions and will certainly not be replicated elsewhere. These studies are, thus, not generalizable. However, I hope that the research presented here inspires other teacher educators and EPP leaders to see the possibilities that their own practices and programs have for affecting improved psychological, educational, and professional outcomes for

LGBTQ-identified students, teachers, and families. I implore those who are positioned and ready to engage in this effort as teacher educators and hope some will contribute to expanding research related to preparing all teachers, and science teachers in particular, for LGBTQ inclusion in their classrooms. These efforts have a tremendous possibility for positively affecting schools and communities at large.

Chapter 2: Case Study of an LGBTQ-Inclusive Educator Preparation Program

Changes occurring in American society, including demographic shifts, such as the increasing percentages of Asian and Hispanic youth, demand corresponding changes in schools. These demographic shifts and awareness of gaps in student achievement and opportunities have prompted school personnel to focus more explicitly on race/ethnicity and linguistic diversity, which present opportunities for schools to initiate more nuanced and culturally relevant pedagogies. Less generally acknowledged by educator preparation programs (EPPs) though, is the growing awareness of inequities and opportunity gaps between lesbian, gay, bisexual, transgender, and queer[3] (LGBTQ) people and their non-LGBTQ-identified counterparts.

While there have historically been few public demands about the inclusion of gender and sexual diversity in EPPs, the growing awareness of the inequities in the experiences of LGBTQ-identified students has prompted the U.S. Department of Justice to clarify protections for these students under Title IX. Similarly, the Council for the Accreditation of Educator Preparation (CAEP) to enumerate that "all P-12 students" is

> defined as children or youth attending P-12 schools including, but not limited to, students with disabilities or exceptionalities, students who are gifted, and students

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[3] There are many other identities that represent gender and sexual diversity, including intersex, gender asexual, gender queer, and transsexual. Though it is an oversimplification, I chose the umbrella of "LGBTQ" for this analysis due to theoretical frames in existing research in this area. I utilized the terminology of others when citing their work. "LGBT" for lesbian, gay, bisexual, and transgender is the most common other usage in this study.

> who represent diversity based on ethnicity, race, socioeconomic status, gender, language, religion, sexual identification, and/or geographic origin. (CAEP, 2013)

These changes in expectations for EPPs challenge them in several different ways, including: how to prepare teachers to work with same-sex families; how to prepare teachers to effectively teach LGBTQ-identifying students; how to prepare LGBTQ-identifying teachers for the profession; and how to help heterosexual teachers, students and families accept and include LGBTQ people in all aspects of schooling. Understanding these elements of preparation for practice may begin by better understanding EPPs that are already attempting to meet these challenges through LGBTQ inclusion. This case study seeks to understand LGBTQ inclusion in an EPP at a large, public midwestern University. The specific questions guiding this study were:

1. What were the contextual features that affected the LGBTQ-inclusive EPP?
2. What were the specific elements of LGBTQ inclusion in the EPP?
3. What were the strengths and weaknesses of the LGBTQ-inclusive EPP?

Literature Review

Quinn and Meiners (2011) state "at least twenty-five years of research documents the pedagogical, social, and economic value of incorporating lesbian, gay, bisexual, transgender, and queer (LGBTQ) content into curriculum and policies and using sexual orientation and gender identity as frameworks to seek educational and social justice" (p. 135). Yet, they argue, the status quo of LGBT-exclusion in teacher education persists as, historically, "personal behavior weighed more heavily than personal professional

competence in determining a teacher's fitness to serve in a given community" (pp. 136-137). Jennings (1994) gave voice to the psychological and professional toll of this exclusion on LGBT-identifying teachers in *One Teacher in Ten,* including stories of depression, anxiety, and jobs lost. In the second edition of the book, he begins by noting a change, "on the whole more LGBT teachers are able to be open and honest about their identities" (Jennings, 2005, p. xiv). He cites a surprisingly common reason—the teachers' students themselves seemed to be encouraging LGBT teachers to do more. Despite hints of positive change in these voices, large quantitative studies indicate that many students struggle as they experience hostility and violence regularly, which correlate to poor attendance, suicidal ideation, and limited plans for post-secondary education among others (Kosciw, *et al.*, 2010; Kosciw, Greytak, Bartkiewicz, Boesen, & Palmer, 2012; Robinson & Espelage, 2011, 2012). However, studies of teacher education programs indicated that only 60% address sexual orientation during their programs (Jennings & Sherwin, 2006). This was the least frequently addressed measure of student diversity behind race, special needs, language, class, and gender.

Amidst increased knowledge of the harsh realities experienced by LGBT and questioning students and changes in popular acceptance of same-sex marriage, changes in State laws, and the Supreme Court's partial rescinding of the Federal Defense of Marriage Act, it is timely that the CAEP Standards for Accreditation of Educator Preparation (2013) hint at progress as they require that candidates reflect and understand human differences including gender and sexual diversity, "to build stronger relationship and to adapt practice to meet the needs of each learner." Gender and sexual diversity are

important elements of school and classroom cultural reality which, when poorly attended to, may jeopardize psychological health and educational outcomes for students.

Methods

This study was designed as a holistic single-case study. Yin (2009) explains that focus on a single case "can represent a significant contribution to knowledge and theory building" (p. 47). The unit of analysis in this study is LGBTQ inclusion. For this study, the case is bound by the licensure areas in the EPP that had a single common content course in common. This course addressed human relations in modern classrooms through the study of the historical, anthropological, and sociological foundations of education (HASE). The HASE course served as a natural bound for the purposes of this study because it set the tone for LGBTQ inclusion in the individual licensing programs that participated in the course. TCs pursuing their initial licenses to become professional educators in the following licensure areas were included in this study: K-12 physical education and health, K-12 second languages and cultures, secondary English education, secondary mathematics, secondary science, and secondary social studies. K-12 art education was eligible for participation in the study, but did not participate. The study was bound in time to the academic years beginning in 2008 through 2013 though at some points participants discussed events that occurred outside of this five-year timespan.

The Educator Preparation Program

The EPP described here is a post-baccalaureate program at a large midwestern University. The EPP is structured based on cohorts of TCs pursuing licenses organized by the same faculty. For instance, while physical education, adapted physical education, and

health are three separate licenses in the State, these licensure areas participate in the EPP as one cohort. The program began a sweeping redesign effort in 2009 to align its practices with important transformative theories in teacher education focused on improving the educational experiences of public school students. Major elements of the redesign included increasing the number of hours and span of time TCs spent in their field placements, establishing professional learning communities that span the majority of the program, establishing co-teaching as the preferred model for TCs' placements in the field, and emphasizing student learning data as a measure of the EPPs effectiveness. Simultaneous to these transformations, the State adopted the Teacher Performance Assessment (edTPA). The TCs who began the program in the summer of 2012 were the first to complete the redesigned EPP. The 18 major components of the EPP were broken down into three main categories: administrative components; common content courses; and methods courses.

Administrative components. The administrative components included: the curriculum committee that had provided critical input to the design of the EPPs courses in terms of attending to student diversity; the EPP leadership, including the Dean of the College in which the EPP was situated, and the leader of the education research and accountability office; the pre-EPP program; and administrators who supported school partnerships and placements.

Common content courses. The common content courses included in this study focused on: adolescent and child development; drug and alcohol abuse; historical, anthropological, and sociological foundations of education (HASE); learning

technologies; and reading across the curriculum. The HASE course was the only common content course that all of the licensing programs within the EPP participated in. Additional common content courses in the program that did not participate in this study included special education/inclusion and academic English/English learners.

Methods courses. The methods courses varied from program to program to meet the State's requirements and the particular content area requirements of those programs. The methods courses were the primary site of support and preparation of the TCs for the EdTPA.

Participants

Program area leads, key faculty, and key administrative personnel were identified by the researcher with input from administrators in the program and invited to participate in the interviews using the catalog of courses for the EPP and the EPP's handbook. Twenty of the 31 individuals who were invited to participate in the study consented to participate. No participants from the key components of the common content courses related to academic English/English learners and special education/inclusion nor in the methods courses related to art education consented to participate in this study. Thus, these identified key program components were not included in this study. The majority of the participants in this study were within their first decade at the institution. Details about the participants in the study were not included to protect the privacy of the participants who might otherwise be identifiable.

Data Collection

A case study "relies on multiple sources of evidence, with data needing to converge in a triangulation fashion" (Yin, 2009, p. 18). Data collection focused on gathering evidence from interviews. Document analysis was used secondarily to triangulate and expound upon data from the interviews. See Table 2.1 for a summary of the alignment between the program components and the data that was collected.

Interviews. Data from the interviews was primary in the analysis. Each participant was invited to participate in an interview. The interviews defined the breadth and depth of LGBTQ inclusion within the EPP. Responsive interviewing techniques were followed. Responsive interviewing emphasizes flexibility and adaptability such that interviews feel more natural (Rubin & Rubin, 2012). The questions that guided the interviews are included in Appendix C. To ensure the confidentiality of the participants, the interviews were given a code. Each interview is referenced within this chapter according to that code in the following format, "I XX.XX.XX."

Documents. The documents collected included the EPP's field handbook and 39 course syllabi. The number of syllabi was large due to some instructors' choice to submit multiple years of syllabi.

Data Analysis

The research questions defined the analysis of the data. To answer each of these questions "the most significant aspect[s] of [the] case study" (Yin, 2009, p. 161) were emphasized.

Table 2.1

Data Collection Matrix: Type of Information by Source

Program Component	Interviews	Documents
Administration		
Curriculum Committee	Yes	Yes
EPP Leadership	Yes	Yes
Pre-EPP Program	Yes	Yes
School Partnerships	Yes	Yes
Field Placements	Yes	Yes
Common Content Courses		
Academic English/English Learners		
Adolescent and Child Development	Yes	
Drug and Alcohol Abuse	Yes	Yes
Historical, Anthropological, and Sociological Foundations (HASE)	Yes	Yes
Learning Technologies	Yes	Yes
Reading Across the Curriculum	Yes	Yes
Special Education/Inclusion		
Methods Courses		
Art		
English/Language Arts	Yes	Yes
Math	Yes	
Physical Education/Health	Yes	
Science	Yes	Yes
Second Languages & Cultures	Yes	Yes
Social Studies	Yes	Yes

Note. Some individuals share duties in multiple elements of the program. Thus the total number of participants interviewed (n = 20) is not directly relatable to the number of elements of the Educator Preparation Program (EPP) for which interview data was available for analysis (n = 16). Three key components of the EPP were not represented in data collection and were not included in the study. They are included in this table in italics.

Analyzing contextual features. Contextual features may include major structural, human, political, and or cultural elements which influence events and implementation of policies or other initiatives in an organization especially those related to issues of equity (Kezar, Glenn, Lester, & Nakamoto, 2008). Understanding the contextual features of this EPP is important to understanding the curriculum and practices used by the participants in this study as related to their work in the EPP. In this study, contextual features were elements that influenced the whole EPP. The analysis of the contextual features that participants discussed was based on the significance of importance the participants gave to the particular contextual feature.

Specific elements of LGBTQ Inclusion. The "Continuum of LGBTQ Inclusion" developed by Elia and Eliason (2010) was initially used in this study as a theoretical model to understand the specific elements of LGBTQ inclusion in the EPP. Elia and Eliason's framework focused on the elements of sexual health education programs in terms of policies, climate, formal curriculum, and hidden curriculum (see Table 2.2). Their framework included five levels of inclusion for each of these programmatic elements. From the least inclusive and supportive to the most inclusive and supportive those levels of LGBTQ inclusion were hostile, invisible, tolerant, accepting, and integrated.

Table 2.2

Continuum of LGBTQ Inclusion

Level	Policies	Climate	Formal Curriculum	Hidden Curriculum
LGBTQ Hostile	None that protect, may have discriminatory policies	Allows or encourages discrimination, harassment; punishes LGBTQ who are out	None, or negative	Blatantly heterosexist, exclusionary
LGBTQ Invisible	Policies do not name LGBTQ	May not allow derogatory, discriminatory behavior, but do not name it as LGBTQ-oppressive	None	Heterosexist
LGBTQ Tolerant	May have some policies to protect, but often not enforced	LGBTQ do not feel safe to be out due to inconsistent climate	Acknowledge presence of LGBTQ, but do nothing to be inclusive	Heterosexist
LGBTQ Accepting	Most policies protect LGBTQ	Do not allow derogatory comments or discrimination	LGBTQ included in curriculum, but in segregated manner	Supports GSAs, PFLAG, Safe Zone, etc.
LGBTQ Integrated	All policies are inclusive and protective	Students and community are educated on why harassment/discrimination occur and why it is wrong	LGBTQ people and issues are found throughout the curriculum, integrated	All school functions are safe and inclusive

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer. Reprinted from "Discourses of Exclusion: Sexuality Education's Silencing of Sexual Others" by J. Elia and M. Eliason, 2012, *Journal of LGBTQ Youth*, *7*, 29–48. Copyright 2010 by the Journal of LGBTQ Youth. Adapted with permission.

Though Elia and Eliason did not use the continuum in an empirical manner, the elements in it resonated with research related to educational features that others have demonstrated correlate to better outcomes for LGBT-identified secondary students including policies that enumerate protections for LGBT-identified people, supportive educators, the presence of student support groups such as GSAs, and most importantly, LGBT-inclusive inclusive curriculum (Kosciw, *et al.*, 2010; Kosciw, *et al.*, 2012). It is unknown whether or not the inclusion of queer identities would influence those prior empirical findings.

Elia and Eliason's framework was adapted for use in this study utilizing notions of LGBT and LGBTQ-inclusive educational practices from Meyer (2010) which highlighted the importance of classroom leadership and TCs development of LGBTQ-inclusive curriculum. This analytical framework, "The Continuum of LGBTQ Inclusion in Educator Preparation Programs," (CIEPP) focused on LGBTQ-related elements relevant to teacher preparation: policies, practices, climate for teacher candidates, curriculum, classroom leadership, and the teacher candidates' curriculum. The "hidden curriculum," which largely focused on practices within the sexual health programs, was renamed "practices" and adjusted to align with the work of the EPP. "Curriculum" was used to indicate the reading materials, assignments, and activities used by the teacher educators in the EPP whereas "teacher candidates' curriculum" was used to indicate the materials, assignments, and activities that were used by the candidates in their field placements and/or lesson planning during the EPP.

LGBTQ inclusion was not regarded as being binary (e.g., present or absent) in the

CIEPP. Rather, following the lead of Elia and Eliason's framework, the levels of LGBTQ inclusion were designated as: hostile, invisible, tolerant, accepting, and integrated. The framework was adjusted in minor ways after some early data was collected to clarify distinctions between the levels of LGBTQ inclusion. The final CIEPP used for data analysis to answer the second research question is included in Table 2.3. All of the data used in this study was analyzed using this framework.

Strengths and weaknesses of the EPP. Analysis of the third research question focused on the strengths and weaknesses of the EPP in terms of LGBTQ inclusion followed a qualitative process similar to those used to answer the first research question. The participants were directly asked in the interviews what they viewed as being the strengths and weaknesses of the EPP in terms of LGBTQ inclusion.

Study Purpose and Tone

The purpose of this study was intended from its inception to be transformative. It was meant to engage the EPP in constructive conversation around LGBTQ inclusion and promote greater understanding and communication regarding LGBTQ inclusion. Labeling, blaming, and shaming of faculty and administrators was avoided to promote dialogue and sharing that might have stopped if the tone of the process did not stay positive. This resulted in an approach that participants described as informative, compassionate, and generative. After participating in the interview portion of the study, several participants requested reading materials and research to improve their practices around LGBTQ inclusion. The researcher was able to engage a high degree of institutional buy-in to the study, which prompted broad participation across the EPP.

Table 2.3

Continuum of LGBTQ Inclusion in Educator Preparation Programs

Level	Policies	Practices	Climate for Teacher Candidates	Curriculum	Classroom Leadership	Teacher Candidates' Curriculum
LGBTQ Hostile	None that protect, may have LGBTQ discriminatory policies	Inclusive policies may be ignored in practice	Allows or encourages discrimination, harassment; Out TCs experience punishment	Negative representations of LGBTQ people or topics in the teacher educator's curriculum	TCs are taught to ignore LGBTQ bias in the classroom or remain neutral about it	Negative representations of LGBTQ-people or topics in TCs' curriculum; discourages TCs' attempts at LGBTQ inclusion
LGBTQ Invisible	Policies do not name LGBTQ	LGBTQ people are not considered in practices	No plan for LGBTQ TCs; No or few out TCs	No LGBTQ people or topics in the teacher educator's curriculum; ignored when TCs bring into curriculum	TCs are not prepared for classroom leadership that supports LGBTQ people	TCs do not address LGBTQ topics in the curriculum they plan
LGBTQ Tolerant	Policies are minimal, adhere to mandates (State Law, BOT); Few known policies	LGBTQ People and Issues are unevenly treated	Responsive to LGBTQ TCs; Some out TCs	Acknowledge LGBTQ people or topics when TCs bring it into the curriculum (not proactive or planned)	Responsive to questions from TCs about bullying and classroom management related to LGBTQ; TCs are encouraged to respond to student bullying and bias	Few examples of TCs addressing LGBTQ topics; little support provided

Table 2.3 (Continued)

Level	Policies	Practices	Climate for Teacher Candidates	Curriculum	Classroom Leadership	Teacher Candidates' Curriculum
LGBTQ Accepting	Policies are minimal, adhere to mandates (State Law, BOT), Policies are known and understood	LGBTQ people and issues receive response when brought to the attention of authority	Offers Safe Zone or supports to LGBTQ TCs; Some out TCs	LGBTQ people and topics are included in teacher educators' curriculum in a manner to prepare TCs for work with LGBTQ students and communities, but in segregated manner	Plans for addressing classroom leadership to support LGBTQ people; TCs are encouraged to respond to student bullying and bias	Some examples of TCs who have planned for LGBTQ inclusion; some guidance provided
LGBTQ Integrated	All relevant policies are inclusive and protective; continual consideration given to making policy of good practice; policies are known throughout the program	Practices reflect proactive care to do what is best for LGBTQ person regardless of policy	Out TCs are fully integrated in the community	LGBTQ people and topics are integrated into teacher educators' curriculum in a manner to prepare TCs for work with LGBTQ students and communities	TCs are encouraged to be proactive and inclusive in establishing LGBTQ accepting classroom leadership; have opportunity to practice strategies about responding to bias	Numerous TCs have addressed LGBTQ topics; lots of support provided

Note. BOT = State board of teaching; EPP = educator preparation program; LGBTQ = lesbian, gay, bisexual, transgender, and queer; TC = teacher candidate.

Member Checking by Participants

The participants in this study were invited to a presentation about the findings from this study. During this presentation the components of the EPP received a composite analysis of their component of the EPP using the analytical framework presented in Table 2.3. These were presented to representatives of the components of the EPP directly and confidentially. At no time were the specific participants in the study revealed to the leadership, faculty, or staff in the EPP. Participants were invited to share their feedback about their component of the EPP and participate in future data collection. No participants submitted revisions to the analysis they were presented with. Representatives of the program components of the EPP reported verbally that the presentation and analysis was helpful in prompting their understanding of their own work and the work of their colleagues.

Limitations

The holistic single-case study design used here is not intended to lead to generalizable conclusions. This largely descriptive study is intended to prompt understanding of the nature of LGBTQ inclusion within EPPs.

Study Findings

The findings are framed around answering the three questions posed by this study: What were the contextual features that surrounded the LGBTQ-inclusive EPP? What were the specific elements of LGBTQ inclusion in the EPP? And, what were the strengths and weaknesses of the LGBTQ-inclusive EPP?

Contextual Features of the LGBTQ-Inclusive EPP

Analysis of the interviews and documents provided no clear understanding regarding why or how this EPP determined to pursue LGBTQ inclusion. There was no single faculty member, no single critical event, nor directive from an administrator that began the work of LGBTQ inclusion in the present institutional memory of the EPP. From the perspective of the participants, LGBTQ topics were welcomed when they arrived whether or not they had been visibly present historically. However, several critical contextual features and events were repeatedly addressed by the participants during the interviews that provide understanding about the context of this EPP.

Curriculum committee. A curriculum committee was designated during the redesign and charged with detailing how the EPP would prepare its TCs for instructional practices with diverse learners. The focus of the committee's work was on the common content courses. From their initial charge, the committee was expected to enumerate sexual orientation and gender expression as part of student diversity. A faculty on the committee stated, "we were charged with thinking outside of the box… the process and style was intended to be part of the struggle… how do we work through this struggle for students and teacher candidates" (I 6.1.1). Although LGBTQ inclusion might have seemed like an imperative to members of the committee, the academic freedom of the faculty and a lack of directives from the State dictated that a faculty member outside of the committee said, "programmatically there was no push for this… State Standards… nothing there… so much is up to the personal and professional convictions of instructors here" (I 11.12.1).

The media responds. During the redesign, an early draft of the curriculum committee's work intended for internal purposes only was leaked to local, politically conservative media personalities. The EPP and members of the committee were specifically named in newspaper articles and on talk shows. The program was presented in the media as "indoctrinating" candidates into a biased worldview that included recognizing heteronormativity (I 11.12.1). The tone of the media coverage was overtly hostile and prompted some members of the public to send threatening letters to the members of the faculty on the committee. A lawsuit was initiated against the University demanding that gender and sexual diversity be removed from the curriculum. The college defended the EPPs inclusion of LGBTQ-topics on the grounds of academic freedom.

Nearly four years later, the stress of these events was still palpable during interviews with members of the committee. One stated, "it strengthened our resolve… we knew that what we were doing was right… it made some members of the committee more politically savvy and cautious… we had to think about how these things were pitched" (I 6.1.1). Thus while LGBTQ inclusion continued to be pursued by the EPP, the faculty learned clearly that they were acting in a highly contested area of teacher education curriculum, and further, that they were being monitored closely.

The suicides and lawsuits in a nearby school district. The community around the EPP had been shaken by a wave of suicides and a high profile set of lawsuits in a nearby school district. The lawsuits focused on the manner in which the school district had mishandled their responses to bullying of students who identified along the LGBTQ spectrum or who were perceived by their peers as such. The cases were ultimately settled

when the U.S. Department of Justice stepped in and mandated that the district hire a Title IX expert and provide training for its entire staff about responding to bullying and mental health crisis.

A faculty explained that the events in the district had demonstrated the importance of LGBTQ inclusion in school settings saying, "I'd say that where we are is in a point of improving. We are certainly aware unless you have been living in a cave – how could you not be aware? But we need to be moving beyond awareness to actually doing something" (I 9.12.1). These events were intentionally integrated into the curriculum of the EPP even as they were emerging in the news to signal strongly to TCs their responsibilities to students given the State's LGBT-inclusive human rights and employment protections. A faculty member stated, "we want to get teacher candidates' attention that we are messing this up in our own community" (I 6.1.1). This faculty expressed understanding that TCs needed guidance about responding to homophobia and heteronormativity as a means to create safe and welcoming learning environments.

Another instructor in the program indicated the resistance the community had to teachers addressing sexual orientation. "[District] signs to new teachers that this is a dangerous topic, it's not safe for them to engage or critique" (I 17.12.1). Without inclusion about the importance of addressing LGBTQ-topics in school settings, TCs might avoid them.

Same-sex marriage. A proposal to define marriage as the union between one man and one woman was put up to voters in the state just as the lawsuits were settled in the nearby school district in regard to their responses to student bullying, This proposal

would have effectively banned same-sex marriage in the state, but the voters did not pass the ban. In the following legislative session, the wave of support for LGBTQ-identified people prompted representatives in the State to pass same-sex marriage legislation. These events were palpable to faculty in the EPP. One said about LGBTQ-topics:

> […]this is front and center… it's a big part of the public discourse here in [the state]… public radio had frank interviews prior to the election… conversations about why people would be opposed… love seemed to actually get through to people… it's a rich and uncertain time. (I 11.12.1)

This particular instructor had launched a significant lesson about gender and sexual diversity in schools the day after the vote to ban same-sex marriage. Faculty regarded LGBTQ inclusion as simply being part of the public dialogue of the times. They engaged it and invited it into their courses. A faculty member in a program that had low inclusion commented about TCs directly bringing questions to them about how to respond to student questions about LGBTQ-people or topics when they came up in K-12 classrooms.

Elements of LGBTQ Inclusion in the EPP

Analysis of LGBTQ inclusion in the EPP was organized into the major elements of: policies, practices, climate for TCs, curriculum for TCs, classroom leadership, and the TCs' own curriculum (see Table 2.3). Within the "on campus" side of the EPP there was little evidence of LGBTQ-hostile elements. LGBTQ-hostile elements were included as a theoretical possibility within this framework as were other levels for which there was no data to tie to the range of LGBTQ inclusion encountered in this study. Table 2.4 summarizes the analysis of LGBTQ inclusion within the EPP.

Table 2.4

Analysis of LGBTQ Inclusion in the Educator Preparation Program

Level	Policies	Practices	Climate for Teacher Candi-dates	Curricu-lum	Class-room Leader-ship	Teacher Candi-dates' Curricu-lum
LGBTQ Hostile						
LGBTQ Invisible		2	5	1	4	10
LGBTQ Tolerant	15*	6*	6	6	3	2
LGBTQ Accepting		5	4*	5	4	2*
LGBTQ Integrated		2		3*	4*	1

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer. Analysis of the interviews with leadership did not focus on the specific elements of LGBBTQ-inclusion in the EPP thus the total of components represented in this table is $n = 15$. An "*" was used to indicate LGBTQ inclusion in the HASE course.

Policies. There were few official policies within the EPP that specifically related to LGBTQ people or topics. The most important, though, that was mentioned by most participants was the University wide non-discrimination policy. This policy was printed in the EPP's field handbook and appeared on some course syllabi: the University "shall provide equal access to and opportunity in its programs, facilities, and employment without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression." This policy was interpreted by the participants as indicating that no TC would have to endure hostility in their field placement based on their actual or perceived identity as LGBTQ (I 11.12.1). When asked what would happen if a TC did express concern in this manner, several faculty stated that the TC would have the option to change placements. This is discussed further in the section about practices.

Several faculty members perceived that sexual orientation and gender expression were articulated as a part of public school student diversity. No such provision actually existed in the field placement handbook. Faculty emphasized that they believed that TCs had to be prepared for *all students*. The State's standards for the effective practice of teachers did not specify LGBTQ-identified people in its standard related to diverse learners, though it did specify that TCs had to understand other facets of human diversity including race, language, economic resources, culture, community values, exceptionalities in learning. The State enumerated that "the teacher must understand how to recognize and deal with dehumanizing biases, discrimination, prejudices, and institutional and personal racism and sexism" (handbook, 2013-2014). No faculty

member mentioned this provision specifically as a basis for LGBTQ inclusion. A faculty member noted about the State standards, "my understanding is that these policies are so broad that they almost don't mean anything" (I 10.1.1).

Overall, the presence and understanding of the EPPs policies was very uniform. The written policies of the EPP were LGBTQ-tolerant as they went as far as the state government required that they go. A faculty member suggested requiring that each program area demonstrate LGBTQ inclusion saying, "it makes more sense to do it on a program level than at a course level. If all the instructors in a program sit down together and talk about it and having a mechanism in place to require that conversation" (I 14.1.1).

Practices. While the policies for the EPP could readily be understood as LGBTQ-tolerant, the practices told a story that was more complex. Some faculty who taught courses were not aware of any practices that related to LGBTQ-topics. These responses included, "not really that, that I've seen" (I 14.1.14), "no, not that I've noticed" (I 13.1.14) and, "I don't know" (I 10.12.1). These responses were best understood as LGBTQ invisible on the continuum. Other faculty indicated that they were considerate of where they placed LGBTQ-identified candidates as they sought to find them placements that would be respectful towards their identities. For instance, a faculty member stated, "the program would be quick to intervene if some candidate was in a place they were uncomfortable" (I 17.12.I). This was not a practice that was particularly unique to LGBTQ-identified TCs. The faculty members in the EPP were genuinely considerate about all of their TCs' placements in schools as they sought to ensure positive experiences for their TCs as well as for the cooperating teachers and schools who

accepted the TCs into their classrooms. Specifically extending this practice to LGBTQ-identified candidates suggested practices that were LGBTQ accepting.

There was evidence that some components of the EPP went beyond LGBTQ accepting. A faculty member explained that when they placed LGBTQ-identified TCs, they introduced them to colleagues who identified similarly. The faculty member explained this practice saying, "for an emergent teacher who needs those mentors, and that's true for my students of color too and those from working class backgrounds, I want them to know that these are folks that they can come to depend upon culturally" (I 17.12.1). The practices within this element of the EPP thus went beyond LGBTQ accepting to LGBTQ integrated based on its anticipatory and proactive practices.

Another LGBTQ-inclusive practice was indicated at the administrative level. Despite sometimes having trouble finding enough field placement locations, an administrator said, "we do not partner with [identified]" (I 8.1.1). This decision had been based on the district's history of mishandling LGBTQ-related bullying. The practices within this element of the EPP were analyzed as being LGBTQ integrated given its proactive affect throughout the EPP.

Overall, the EPPs practices related to LGBTQ inclusion ranged from LGBTQ invisible to LGBTQ integrated. As one faculty expressed, the practices related to LGBTQ inclusion largely depend on the particular faculty teaching the course (I 2.2.1).

Climate for teacher candidates. The climate for LGBTQ-identified TCs in the program was given consideration in the analysis. Similar to the practices in the EPP, there was variability between the different components of the program. There was some

overlap between the practices in the EPP and the climate for LGBTQ-identified TCs because several practices discussed by participants related to how components in the EPP might respond to TCs who disclosed an LGBTQ identity publically (these TCs may be referred to as "out").

Participants from non-teaching components of the EPP who were not frequently in direct contact with TCs indicated that they believed the climate was ok. For instance, one said, "I haven't heard concerns" (I 11.12.1). Another participant who was not teaching courses but had some interaction with TCs said, "there is a very inclusive environment here on campus. Teacher candidates who have been out have affirmed that" (I 8.1.1). No faculty expressed any open hostility towards LGBTQ-identified TCs. Thus, there was no evidence that the environment for LGBTQ-identified TCs in the EPP was LGBTQ hostile on the continuum.

Faculty participants in the study demonstrated a range of strategies for creating LGBTQ-inclusive climates for their TCs. An instance of an LGBTQ tolerant element in the EPP occurred within a course many TCs participated in online. The faculty member who coordinated the course explained the lengths they had gone to in an effort to create a welcoming environment for LGBTQ-identified people. Their strategy to establish that environment had involved removing references to opposite sex couples and gendered language from their curriculum completely. This very intentional attempt did not yield evidence that it had created a course culture that was viewed as safe by LGBTQ-identified TCs. The faculty said:

> I cannot remember when a teacher candidate self-disclosed an LGBTQ identity – sometimes faith. In the values and beliefs assignment there is rarely an LGBTQ disclosure… Often someone will say that they're married, have a wife and kids… mostly cisgender[4] and heterosexual. (I 30.1.1)

This was noticeable in the data because other faculty indicated that they knew of LGBTQ-identified TCs in their courses which, undoubtedly, included many of the same TCs as those who were taking this particular course. It was possible that the attempt to hide sexual orientation and gender completely may have had the unintended effect of shutting down discussion related to gender and sexual diversity. Though this faculty had good intentions, similar effects have been observed in other studies of environments that have specifically eliminated or banned LGBTQ topics. Instead of creating a welcoming environment by avoiding sexual orientation and gender identity, this attempt may have produced a "neutral" environment. These environments may have the effect of reinforcing the generally homophobic and transphobic status quo (Meyer, 2010).

In contrast, several faculty members who had explicitly made their courses spaces for openly discussing LGBTQ topics indicated that there were TCs who shared about their own LGBTQ identities. One faculty member said:

> I feel it that the environment is open. But, teacher candidates have felt various levels of comfort. It is hard to say if other cohort members have sent different

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[4] Cisgender is a term that describes individuals whose biological sex, generally male or female, corresponds to their socially-constructed gender. E.g., a male who identifies as a boy or female who identifies as a woman.

> messages. The teacher candidates know how to play the game. If dominant voices in the cohort are not truly accepting that can make a difference. (I 9.12.1)

This faculty member's perception of the role of the climate in the cohort was similar to another faculty member who knew of LGBTQ-identified TCs in their course. That faculty member said, "the candidates tend to know each other pretty well because they are in the cohort. Which means, could mean, that it's not that they feel comfortable in the program to be out, but that they feel comfortable in their cohort" (I 10.1.1). This was evidence of an LGBTQ tolerant level of inclusion.

Two faculty members specifically indicated that LGBTQ-identified TCs were given opportunities to privately discuss navigating their identities as teachers within their component of the EPP (I 17.12.1 and I 9.12.1). The specific details of how they made such offers to the TCs were not made explicit. There was evidence in the assignments within another course that TCs were explicitly invited to share about their sexual orientation or gender identity within that element of the EPP. This prompt read, "how has race, ethnicity, religion, class, sexual orientation, gender, or disability affected your life?" and, "describe a specific time when you noticed your gender and/or sexual orientation influencing your schooling experience. How exactly did it become apparent that gender and/or sexual orientation mattered - in that moment?" It is important to note that these prompts were invitations for reflection not requirements. The TCs were explicitly told that they did not have to disclose aspects of their identities that they wished to keep private. Components in the EPP that proactively welcomed and supported their LGBTQ-identified TCs demonstrated inclusion that was LGBTQ accepting.

Within the EPP, the climate for LGBTQ-identified TCs was inconsistent ranging from LGBTQ invisible to LGBTQ accepting. It was likely that an LGBTQ-identified TC in one licensure area might have a profoundly different experience in relation to their transition to teaching as a candidate in another licensure area due to the cohort nature of the EPP.

Curriculum. The analysis of curriculum in the EPP focused on the materials and activities that were discussed by participants as relating to LGBTQ inclusion. No participant or document suggested inclusion that was LGBTQ hostile. Faculty in common content courses which did not include specific readings or assignments related to LGBTQ topics explained that their courses met very specific requirements from the State and were too brief to plan for addressing the topic. The following is an example of such a response:

> […]for the [course] there's not much that can really happen there because it's so limited in its scope. I mean, it's designed to do a very limited thing and there's not a lot of wiggle room to do anything beyond what the board of teaching requires (I 14.1.1)

These participants indicated that they had responded to questions from TCs about LGBTQ topics. Components within the EPP that were responsive to LGBTQ topics, but did not plan for them were indicative of inclusion that was LGBTQ tolerant.

Interviews with participants and analysis of syllabus suggested that LGBTQ inclusion in the EPP occurred primarily in two common content courses, the HASE course that all TCs participated in and a course on adolescent and child development that most TCs

participated in. These courses included numerous readings that specifically addressed LGBTQ topics. These ranged from a very theoretical article by Michael Kimmel titled "Masculinity as Homophobia" to the very technical guide "Just the facts about sexual orientation and youth: A primer for principals, educators, and school personnel." See Table 2.5 for a complete list. In addition to those readings, all of the TCs viewed a portion of the film *Bullied* by Teaching Tolerance. Both of these methods courses included assignments that included sexual orientation and gender identity. In the HASE course, these assignments included the prompt discussed in the previous section that asked TCs to reflect on their own identities including, if they chose to, their own sexual orientation and gender identity, and a more focused prompt that asked TCs to:

> Take some time to analytically reflect on what you have observed so far in your practicum experiences with regard to how schools and the education professionals in them approach gender and diversity in sexual orientation. Then, drawing on these insights, discuss as specifically as possible, your own developing approach as a teacher to creating a classroom environment that is gender and sexual diversity-fair and ensures that all students can flourish.

The specific prompt used in the adolescent and child development course was not listed in the course syllabus. A participant described the prompt in this course in this way:

> […]this prompt might ask them to be deliberate and thoughtful with the readings to draw out overlapping identities and to really make connections to the previous sections content which was racial and ethnic identities and we have a section about peers and friendships in schools and I am trying to press them to think

> about what does it mean to not just be gay, but maybe what does it mean to be a gay woman or a gay black man? (I 10.1.1)

The curriculum in these components of the EPP demonstrated inclusion that was LGBTQ accepting if they addressed LGBTQ topics at just one point in the course and LGBTQ integrated if they addressed LGBTQ topics at multiple points in the course.

Curricular inclusion in the methods courses was highly variable. In several licensing areas this content was substantially tolerant, bordering on invisible. Faculty in these areas could not specify planned LGBTQ-inclusive curriculum of their own. Faculty in courses that were tolerant addressed LGBTQ topics when TCs asked for that information and for resources related to the topics. A faculty member that did not plan for LGBTQ topics said:

> I do not ever remember any intentional learning on my behalf whether it be while I was in school or while I was teaching… I do not remember that I have dealt with a single experience or situation until I came into this role. (I 13.1.1)

This particular faculty member was not aware of LGBTQ-related readings or activities appropriate to their discipline.

Table 2.5

LGBT- Inclusive Reading Selections in the Educator Preparation Program

Reading Selection	Required
Common Content Courses	
"Annotated Bibliography for the Mini-Series on Lesbian, Gay, Bisexual, Transgender, and Questioning Youth: Their interest and Concern as Learners in Schools." (2000). *School Psychology Review,* 29: 231-234	No
Biegel, S. (2010). Addressing school climate: Goals and best practices. In S. Biegel, *The right to be out: Sexual orientation and gender identity in America's public schools.* Minneapolis: University of Minnesota Press	No
Just the Facts Coalition. (2008). *Just the facts about sexual orientation and youth: A primer for principals, educators, and school personnel.* Washington, DC: American Psychological Association	Yes
Kimmel, M. (1994). Masculinity as homophobia: Fear, shame, and silence in the construction of gender identity. In H. Brod, & M. Kaufman (Eds.), *Research on Men and Masculinities Series: Theorizing masculinities*. (pp. 119-142). Thousand Oaks, CA: SAGE Publications	Yes
Meyer, E. J. (2010). Introduction: Why learn about gender and sexual diversity in schools? In E. J. Meyer, *Gender and sexual diversity in schools*. New York: Springer	Yes
Nakkula, M. J., & Toshalis, E. (2006). *Understanding youth: Adolescent development for educators*. Cambridge, MA: Harvard Education Press	Yes
Sadowski, M. (2003). *Adolescents at school: Perspectives on youth, identity, and education*. Cambridge, MA: Harvard Education Press	Yes
Methods Courses	
Beck, T. A. (2013). Identity, discourse, and safety in a high school discussion of same-sex marriage. *Theory and Research in Social Education*, 41: 1-32	Yes

Table 2.5 (Continued)

Blackburn, M. V. & Buckley, J. (2005). Teaching queer-inclusive English language arts. *Journal of Adolescent & Adult Literacy*, 49: 202–212	Yes
Mayo, J. B. (2013). Critical Pedagogy Enacted in the Gay-Straight Alliance: New Possibilities for a Third Space in Teacher Development. *Educational Researcher*, 42: 266-275	Yes
Rands, K. (2009). Considering Transgender People in Education A Gender-Complex Approach. *Journal of Teacher Education*, 60: 419-431	Yes

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer. Selections are sorted in alphabetical order. Materials marked as required were mandatory for teacher candidates enrolled in the course that assigned the reading. Due to the structure of the EPP, the teacher candidates were enrolled in numerous different courses and did not experience the same required readings.

The redesign had been an impetus for greater LGBTQ inclusion in one licensing area. A participant indicated that they invite an expert speaker, have observation assignment prompts related to gender and sexual diversity, and engage the TCs in the examination of the language used in textbooks to discuss sexually transmitted illnesses (3.12.1). However a participant from another licensing area commented, "after [the redesign] we no longer do the diversity projects [included sexual orientation], we let the [common content courses] handle that…" (I 13.1.2). This faculty member cited the increased requirements of the EPP, especially the educator Teacher Performance Assessment (edTPA), as the licensing areas primary impetus for reducing the time specifically spent on LGBTQ inclusion within their methods courses.

Classroom leadership. Classroom leadership focused on LGBTQ inclusion in the EPP that prepared TCs for managing student behavior or creating positive learning environments. In some components of the EPP the terms "classroom management" or "classroom ecologies" were preferred. Although there is a significant difference in these approaches, the emphasis on this element of LGBTQ inclusion was on how the component of the EPP was preparing TCs to create learning spaces that would be supportive for LGBTQ students and topics. Within the EPP, LGBTQ inclusion related to classroom leadership varied from invisible to integrated.

LGBTQ inclusion was regarded as invisible when the component of the EPP did not prepare TCs for how LGBTQ topics would affect classroom leadership. For example, when asked about how LGBTQ topics related to classroom leadership were addressed a participant said, "that particular issue has not come up" (I 19.3.1). Within some

components of the EPP, LGBTQ inclusion related to classroom leadership was not planned for but was addressed because TCs asked questions related to the topic. For instance, a faculty member teaching a course that was analyzed as tolerant stated that "a topic that does come up is the heavy usage of the word gay – being respectful and understanding what is being said, like retard or the n-word" (I 13.1.1). Such instances demonstrated LGBTQ tolerance.

LGBTQ inclusion at the level of accepting required that the component of the EPP had planned for how their TCs would be prepared to address bullying or bias towards LGBTQ students. A participant in a component that was accepting in terms of LGBTQ said:

> Certainly I hope that the message is that if something is done or said that is inappropriate as the adult in the classroom you have to deal with it – you know, name calling, bullying, the loose use of terms, name calling – respond in ways that are appropriate. To me, that's management, but it's also just part of being a good teacher. They don't just pretend it didn't happen. But, then the hope it that they'll say it's wrong not just because I said so, but that they will talk to the kids about why it is wrong and why it is not okay. Again, this is not necessarily explicit, but it's all part of the larger conversation about management. (I 9.12.1)

Though it was evident that TCs were encouraged to respond to inappropriate behavior in their classrooms, components of the EPP with inclusion at the accepting level did not provide TCs with opportunities to practice their responses outside of their field placements or engage in case studies relevant to their licensing area.

Integrated LGBTQ inclusion related to classroom management necessitated focusing proactively on how to establish classrooms culture that was welcoming to LGBTQ topics. This is an example of such an effort within the EPP:

> a lot of times when a GLBT topic, when GLBT youth comes up it's a concern about about how not to marginalize them, it's a concern about how to set-up culturally relevant practices so they can see their own lives and stories around the greater discourses of homophobia. So, that's what I would say that we have conversations about. It's not framed about in the same way as how we might frame conversations about black and brown students and how they resist schooling. I think it's more about how does the teacher navigate sort of the [school district] stuff you know and how do you navigate the whole element that if we don't talk about these things than they just persist, the marginalizing and silencing of queer students. It's really about the management of homophobia is what it really is. Like, how do you manage spaces where homophobia is going to sneak in. (I 17.12.1)

The emphasis in this response was not on responding to bias or bullying that was LGBTQ related, but on establishing a whole class culture that would be conducive to making space for LGBTQ perspectives. LGBTQ inclusion at the integrated level also involved providing TCs opportunities to try classroom leadership techniques through microteaching or scenarios. The following are examples of scenarios that were included in the HASE course:

- You overhear a student discussing another student. You pick up the words, "bi…" and "disgusting…" and, "with a boy AND a girl…" You haven't heard the whole conversation. What could you do?
- You've sent out your classroom rules and policies to all of the parents of your students. You have included a statement that your classroom is a "Safe Space" for LGBTQ-identified students. A parent writes back, "my family objects to the protection of sinners and perverts! I do not want my child learning about such things." How would you reply?
- Some of your students observe another student entering a bathroom. They say, "Teacher, Mark just went into the girls bathroom!" How would you respond to the student? How would you proceed?

These short scenarios were discussed in the course in small groups with the guidance of a facilitator.

Teacher candidates' curriculum. The final area for consideration regarding LGBTQ inclusion in the EPP was the extent to which TCs were prepared for and made LGBTQ inclusion a part of their own curriculum during their field placements. There was no indication in the data that the LGBTQ inclusion was hostile within the curriculum that TCs developed. There was no indication that any component of the program was encouraged TCs to represent LGBTQ topics or people in negative ways.

The data from many of components of the EPP indicated inclusion that was LGBTQ invisible in terms of the TCs' curriculum. Participants in these program components had no knowledge of TCs addressing LGBTQ topics in their field

placements. An example of a typical response of this variety was, “no teacher candidates’ lesson plans related to LGBTQ. I have no recollection of a lesson plan going there” (I 13.1.1). A similar example was, “I have not seen teacher candidates relate this to LGBTQ people” (I 30.1.1). There was no indication within these components of the EPP regarding what supports TCs might receive if they did address LGBTQ topics in their field placements.

LGBTQ inclusion at the level of tolerant was indicated within components of the program that could identify a small number of instances in which TCs had addressed LGBTQ topics. For instance, “one candidate used a same-sex pair in a [discipline specific example] – do you fill it in or not? He will have it in his curriculum” (I 4.12.1). These components offered some support to assist TCs in regards to LGBTQ inclusion, for instance, “candidates get feedback on their lesson plans if they are heteronormative” (I 13.1.2). Inclusion at the accepting level was indicated by greater support and encouragement of TCs in regards to addressing LGBTQ topics within their curriculum. For instance, “there have been some folks using the [discipline specific] curriculum” (I 9.12.1). In this instance, the example provided had been modeled by the instructor indicating an explicit support for LGBTQ inclusion in the TCs’ curriculum.

LGBTQ inclusion at the integrated level was distinguished by components of the EPP which could identify numerous examples of TCs addressing LGBTQ topics in their field placements. For instance, one participant said:

> I have seen TCs using LGBTQ people in urban schools. Not in suburban. It’s often about the cooperating teacher and what they want to teach. Then it’s about

> preparing the teacher candidates to teach against the grain of these major texts, like bringing in companion texts. It's less common for candidates in suburban places. They don't planfully evoke or resist their cooperating teachers about LGBTQ topics. The discourse is still too strong. (I 17.12.1)

It was evident from this quote that TCs were receiving guidance in regards to how to plan for LGBTQ inclusion even if they had limited control over their curriculum.

Strengths and Challenges to LGBTQ Inclusion

The final research question emphasized the strengths and challenges that the participants viewed the EPP had in terms of LGBTQ inclusion. The strengths and challenges to LGBTQ inclusion in this EPP were directly elicited from the participants during interviews. A summary of the strengths and challenges as indicated by the participants is presented in Table 2.6.

The strengths of the EPP were rooted in the faculties' adherence and strong internalization of the University's non-discrimination policy. The faculties' interpretation of this policy set a tone demanding that open hostility towards LGBTQ topics or people would not be tolerated in the EPP. While this policy sent a clear message to faculty on the University's campus, it seemed that the general lack of clarity about the interpretation of this policy and the lack of specific attention to sexual orientation and gender expression in the field placement handbook could send mixed messages to TCs and cooperating teachers. Greater specificity in the field placement handbook and in training for faculty, including cooperating teachers, could address this weakness in the EPPs capacity to be LGBTQ-inclusive.

Table 2.6

Strengths and Challenges to LGBTQ Inclusion

Strengths	Challenges
University non-discrimination policy	Few formal policies
Academic freedom	Inconsistency in treatment of LGBTQ people and topics between faculty and programs
Supportive faculty (willing, open, and responsive)	Lack of opportunity for communication among faculty
Faculty with close connection to LGBTQ needs and people	Lack of knowledge/experience with LGBTQ people and topics in
LGBTQ treated similarly to other aspects of human diversity	Packed required curriculum including the edTPA/limited duration of program
EPP's commitment to culturally relevant pedagogy	Narrow focus on bullying and/or negative outcomes for LGBTQ people

Note. edTPA = educator teacher performance assessment; EPP = educator preparation program; LGBTQ = lesbian, gay, bisexual, transgender, and queer; TC = teacher candidate.

Another strength of this EPP identified by the participants was that LGBTQ topics and people were treated in a similar manner to other areas of human diversity including race, culture, gender, and class. This was supported by the theoretical framing of the EPP around culturally relevant pedagogy. Specific mandates by the State required that the EPP address special learning requirements (*e.g.*, disabilities, gifted and talented learners, and linguistic diversity) as well as sociocultural factors such as race, culture, and class in greater detail. The State did not require that TCs be prepared to address LGBTQ topics nor the factors that might affect an LGBTQ-identified student in their classroom. While it was treated similarly, one participant who worked towards better inclusion of LGBTQ topics said "when it comes right down to it there's a giant discomfort around it… I see it in my own class" (I 10.1.1).

Given the lack of specificity from the State in regards to gender and sexual diversity, a weakness in regards to LGBTQ inclusion in the EPP was the limited duration of the program and the high number of requirements that were specified by the State and other authorizers of the program. Some participants expressed that, due to the number of requirements that they had to address, that they had little time to address topics that they acknowledged as highly important including LGBTQ inclusion. Those participants whose work in the EPP did address LGBTQ topics expressed that they were unable to do it in a manner that they found satisfactory. Many felt breadth, in general, had compromised depth. A weakness, thus, was that the EPP was perceived as focusing on basic information about LGBTQ people or simplistic scripts about bullying. For instance, one participant said, "this program is consistent with education in general with how it sees

bullying. There are efforts to improve the understanding of bulling, but mostly it's the same scripts being played out around gay youth, homophobic scripts. I.e., 'boys will be boys' (I 10.1.1).

While it was regarded as a strength that greater LGBTQ inclusion was occurring within the EPP after the redesign, some participants saw it as a weakness that LGBTQ inclusion was, with few exceptions, largely isolated into the common content courses and the HASE course in particular. A participant explained why they felt integration in the EPP was desirable compared to this kind of isolation:

> I think my preference would be integration. I can also imagine that there might be a course on LGBT-inclusivity, which wouldn't be the worst thing in the world, but you're pushing LGBT students aside as 'those kids' and you take this course and then you know everything you need to know and that's, of course, not really true. Teachers should be thinking about this in relation to everything they do as a teacher and that's not something that's really communicated if you have a separate course, it compartmentalizes in a way that doesn't address the complexity of the issue and what really needs to happen in the classroom. (I 10.1.14)

While several participants identified the commitment of many of the faculty to LGBTQ inclusion as a strength in the program, there was unevenness. One participant said, "there is turnover of graduate assistants and a lack of continuity in the quality of the graduate assistants. How are they being prepared to talk about queer youth and identities?" (I 17.12.1). A small number of faculty members indicated that they felt that

they lacked resources and training in regards to the needs of LGBTQ-identified teachers, learners, and families.

A final weakness identified by the participants was the lack of communication among the components in the EPP in regards to LGBTQ inclusion. Several participants indicated that this communication had improved as a result of the redesign, but those who had not been involved in the redesign felt that they had very little understanding about LGBTQ inclusion in the EPP.

Conclusion

The analysis of the first research question regarding the contextual factors around the EPP that affected LGBTQ inclusion had drawn out features that were addressed by participants numerous times during their interviews. For instance, the suicides and lawsuits in the nearby school district were referred to by several participants when discussing practices within the EPP that they regarded as being in line with supporting the development of their readiness for LGBTQ inclusion. The media response to the leaked documents, though, was disruptive to the EPPs work in this regard. While it had reinforced some participants' perspectives that LGBTQ inclusion was important work for the EPP, it also had a chilling effect that quieted those efforts. The passage of legislation that permitted same-sex marriage in the State may have mitigated some of the effect of the media's response as it indicated the trend in the public's perspective towards increased acceptance.

The analysis of the second research question comprised the bulk of this study. While LGBTQ inclusion within the various components of the EPP varied between

LGBTQ invisible and LGBTQ integrated, inclusion in the EPP as a whole could be regarded as LGBTQ tolerant. Analysis of LGBTQ inclusion across this EPP indicated that while the HASE course generally had higher levels of LGBTQ inclusion, there were other components of the EPP that reached higher levels of LGBTQ inclusion (see Table 2.4). This conclusion was consistent with Sherwin & Jennings (2006) finding that diversity of sexual orientation was most frequently addressed in common content courses. Perhaps the most significant indicator of how much room the EPP had to develop in regards to LGBTQ inclusion was the limited extent to which TCs in the EPP were bringing LGBTQ topics into the curriculum that they developing during their field placements.

Finally, the third research question provided an opportunity for the participants in the study, all of whom worked in the EPP, the opportunity to identify the strengths and weaknesses that they perceived in regards to LGBTQ inclusion in the EPP. Overall, the participants perceived that the inconsistency and variability within the various components of the EPP limited LGBTQ inclusion and how it might affect TCs future work as teachers. No participant in the study felt like LGBTQ inclusion, nor any other diversity topic, was being given the attention that it deserved within the EPP. The most significant constraints that participants identified were the limited duration of the program and the numerous mandates and requirements, however important they might be, that the EPP was required to address.

Implications for the Educator Preparation Program

The most significant implication for the EPP was that LGBTQ inclusion needed further integration beyond the common content courses into the methods courses and, most importantly, into the TCs field placement experiences. While this may be done through the practices of the EPP, codifying the expectation for LGBTQ inclusion in policies would promote clarity across the components of the EPP.

The EPP could work with the State to encourage that standards for teacher preparation explicitly indicate gender and sexual diversity as elements of human diversity that impact student learning. Such standards could specify that TCs must learn about LGBTQ people and their experiences and be ready to integrate those experiences into their practices as teachers. The new CAEP standards provide a clear justification for this revision to the State standards for new teachers.

Waiting for the adoption of a standard for teacher education within the State, however, is not necessary for the EPP to set its own policies. This codification could be accomplished by adding a specific section to the EPP's handbook referring to the new CAEP standards and stating firmly that the EPP regarded the gender and sexual diversity of students as significant factors in shaping students learning experiences in school. This statement would be strongest if it specified that LGBTQ inclusion ought to occur in common content courses, methods courses, and field placements.

While LGBTQ inclusion in the EPP had some room for development within the common content courses, there was more room for development in the methods courses. Increased integration into the methods courses could be encouraged through, as was

recommended by a participant, asking that each licensure area evaluate its courses and identify where LGBTQ inclusion would fit within their area. A challenge to this strategy, though, is that those some participants identified that some instructors lacked the expertise and familiarity with LGBTQ topics to recognize where those topics might naturally fit within their curriculum. Licensure areas that lack the expertise to integrate LGBTQ topics ought to seek assistance increasing the readiness of their faculty through professional development. Speakers with expertise in researching LGBTQ inclusion could be invited to the institution to assist in the development of expertise and familiarity. However, as some participants in this study indicated, some disciplinary areas are much further developed in regards to LGBTQ inclusion than other disciplinary areas. Licensure areas with greater knowledge and experience in this area could share how LGBTQ topics are included in coursework in their licensure area to mitigate that challenge.

The greatest room for growth in the EPP was in field placements. Very few components of the EPP reported knowing of TCs addressing LGBTQ curriculum in their teaching in field placements. This may have been because the participants were somewhat removed from the TCs experiences in their field placements. However, given the climate around LGBTQ inclusion and the limited supports that TCs were provided to address LGBTQ inclusion in their curriculum, it is more likely that LGBTQ inclusion by TCs I was rare. Increasing the opportunities for TCs to include LGBTQ topics in their field placements should involve working with the schools and districts in which the EPP places TCs. The EPP should communicate with the school districts and schools in which it places TCs to build understanding around what LGBTQ inclusion is, why it matters for

students, how it fits within current State and Federal laws, and, most importantly, how cooperating teachers would be expected to support TCs placed in their classrooms. The EPP could offer professional development opportunities for cooperating teachers to build the capacity and readiness for LGBTQ inclusion within the schools in which it places TCs. These opportunities could also be offered to supervisors, graduate assistants, and other instructors to improve their readiness to support the development of LGBTQ-inclusive instructional practices among their TCs.

The final implication for this EPP is that it ought to evaluate whether or not the year-long program is sufficient for the EPP to meet its goals for the preparation of TCs. The EPP had recently implemented two substantial innovations as part of the redesign, the adoption of the edTPA and increasing the amount of time TCs spent in field placements. Both of these innovations, though not the focus of this study, were reported to have increased the demands on the faculty in the EPP. The evaluation of these demands on the EPP should include input from faculty and TCs.

Discussion

This study demonstrates that LGBTQ inclusion is a complex and multi-faceted phenomenon in which contextual factors and individual expertise contribute. Beyond the implications for this program, this study also provides a framework for future study about LGBTQ inclusion in EPPs, the "Continuum of LGBTQ Inclusion in Educator Preparation Programs" (CIEPP, see Table 2.3). This study also provides deeper insight into the role of policies in promoting LGBTQ inclusion and its understanding in EPPs. Finally, this study provides suggestions for future research about LGBTQ inclusion in EPPs.

CIEPP. The CIEPP has two potential uses. Its most immediate use would be as a tool for EPPs to evaluate their own efforts at improving LGBTQ inclusion. It could be used in future research to understand LGBTQ inclusion in EPPS. Methodologically, this particular study provides no grounds for the reliability of its use in either of these ways. Lacking reliability, its validity remains to be tested.

In regards to the use of the CIEPP for programmatic self-evaluation, it is recommended that as many individuals in the EPP take the CIEPP as possible and share how their component of the EPP is contributing to LGBTQ inclusion program wide. For this purpose, the CIEPP's main goal would be to promote greater communication and understanding about LGBTQ inclusion in the EPP. EPPs may find that they have pockets of expertise that they may not have been aware of. As a self-evaluation tool, the CIEPP could also be used by EPPs to plan for CAEP accreditation.

In regards to the use of this tool for future research, this study demonstrated that no single individual including central administrators in the program were confident in their knowledge about LGBTQ inclusion. The CIEPP, thus, is not likely to demonstrate reliability in regards to an EPP if used by a single individual at this time. Reliability and validity studies may be considered in the future.

The Role of Policy in Understanding LGBTQ Inclusion in EPPs

Policies that govern the work of EPPs have may contribute both to LGBTQ-inclusion in EPPs, or its lack thereof, and the ability of researchers to understand LGBTQ-inclusion in EPPs. Understanding how policies have impacted the lack of LGBTQ-inclusion in EPPs is relatively evident. EPPs have, by and large, not been

required to attend to preparing TCs for gender and sexual diversity and thus LGBTQ-inclusion has been limited (Quinn & Meiners, 2011). Understanding how this oversight in policy has impacted researchers' efforts to understand LGBTQ inclusion in EPPs is less direct.

Theoretically, the lack of awareness of any one individual in regards to LGBTQ-inclusion in the present study may be the result of the absence of policy requiring that EPPs demonstrate how they are preparing TCs for meeting the needs of LGBTQ-identified students. Other policy pressures presently promote greater understanding of material that relates to other aspects of human diversity. For instance, accreditation bodies ask programs to demonstrate how they are preparing TCs for English language learners, racial and cultural differences, and students with special learning needs. If this theory is true, the inclusion of gender and sexual diversity in the new CAEP standards and, eventually, accreditation reviews may facilitate better understanding on the part of leaders within EPPs about how their own programs are addressing LGBTQ-related topics.

Future Research in LGBTQ Inclusion in EPPs

This study suggested some consideration for future research in LGBTQ inclusion in EPPs. Given the constraints suggested about policies in relation to LGBTQ inclusion, developing a rich understanding of LGBTQ inclusion in EPPs is likely to require either large-scale study with many surveys and/or interviews or very careful identification of key informants who are highly knowledgeable about LGBTQ inclusion in their EPP. Sherwin and Jennings (2006) had sent their online survey to one representative at the

programs that they recruited to participate in their study. They had built in questions about the inclusion of other diversity topics into their survey to provide a comparison between sexual-orientation and these other topics. The present study suggests that a survey sent to a single leader in an EPP may indicate LGBTQ inclusion at lower levels than is actually occurring. The larger the EPP and the more complicated structure it has, the less likely that any one informant will have a nuanced understanding of how LGBTQ inclusion is occurring in their EPP.

This study privileged interview data, but analysis of course syllabi was included to triangulate LGBTQ inclusion within the components of the EPP. Not surprisingly, many of the syllabi shared by the participants suggested less LGBTQ inclusion than was articulated by participants themselves. For instance, several syllabi listed abbreviated bibliographic information for readings that lacked details that would have indicated LGBTQ-topic matter and few syllabi provided details about the assignments that TCs were engaging in that addressed LGBTQ topics. Without the specification of participants through the interviews, reviews of the syllabi alone would have been insufficient to identify course readings, assignments, and/or activities that addressed LGBTQ topics. Future research must consider methodological tradeoffs between interviews and syllabi analysis in terms of understanding important aspects of LGBTQ inclusion in EPPs.

Most importantly, research that seeks to understand whether or not LGBTQ inclusion is occurring at all is very different from understanding how it occurring and, still further, very different from understanding whether or not it is having the effects desired by those designing the curriculum. GLSEN's research has suggested that LGBT-

enumerated policies, supportive educators, student supports such as GSAs, and, most importantly, LGBT-inclusive curricula are correlated to better outcomes for LGBT-identified secondary students (Kosciw, *et al.*, 2010; Kosciw, *et al.*, 2012). This study cannot correlate how any of the elements of LGBTQ inclusion in the EPP related to outcomes for TCs or secondary students.

Given the methodological constraints of this present study and of Sherwin and Jennings' (2006) study, future research should survey TCs directly about LGBTQ inclusion in their EPP and, more importantly, the LGBTQ-inclusive practices that they developed. The final link, then, would be connecting the work of the LGBTQ-inclusive EPP to outcomes for LGBTQ-identified students in classrooms. While that undertaking would involve careful planning across institutions and substantial financial resources, the stakes are high in terms of lost educational opportunity and public health costs for LGBTQ-identified youth to warrant such efforts.

Planning such future large scale studies should include mechanisms for understanding contextual factors and variations outside of the control of EPPs. The present study demonstrated that contextual features including State laws and accreditation standards had contributed to LGBTQ-inclusion within the EPP. Large-scale research should consider how these contextual factors contribute to the practices of an EPP, the practices adopted by TCs, and the outcomes of LGBTQ-identified secondary students. Researchers may need to account for these sources of variance. Policy makers would be irresponsible to hold EPPs accountable for outcomes caused by factors well beyond their locus of control.

Chapter 3: Needs and Opportunities for LGBTQ Inclusion in Life Science Educator Preparation

The Next Generation Science Standards (NGSS) are the most explicitly inclusive science standards yet set in the United States, for the first time specifying that science for all students must attend to the particular learning needs of diverse students, specifically indicating differences of gender, race, culture, English language learning status, and ability to provide equitable learning opportunities that support all students (National Research Council, 2012). The National Research Council (NRC) takes care to note that the efforts needed to attain these standards requires work on the part of the Science education community "to ensure that all are provided with high-quality opportunities to engage in significant science and engineering learning" (p. 29). Case studies illustrating what "all standards, all students" might look like in practice, in addition to research summaries and student group context, are provided in the NGSS (Achieve, Inc., 2013). The NGSS requires that the science teacher education community be ever mindful of who is still being left out of our efforts to broaden participation in science.

This study focuses on the work science teacher educators and science education researchers may do to meet the needs of one such group of students, those who identify as lesbian, gay, bisexual, transgender, and queer (LGBTQ). Before moving further, I wish to note that there are many other identities that represent gender and sexual diversity, including questioning, gender queer, intersex, asexual, and transsexual. Though it is an oversimplification, I chose the umbrella of "LGBTQ" due to its frequency of use in scholarly work. At times this study may use the acronym "LGBT" or "LGBT and

questioning" due to my citation of the work of other researchers. This chapter presents an argument for science teacher educators to provide an LGBTQ-inclusive teacher education program that prepares life science teacher candidates (TCs) for the LGBTQ students that all teachers will encounter. LGBTQ-inclusive science teacher education programs would do so by systemically, consistently representing LGBTQ people in positive and accepting ways; including curricular topics that relate to/affect the LGBTQ community; and challenging heteronormativity, including gender binaries.

Due to the paucity of science education specific research about LGBTQ inclusion, this chapter is largely theoretical. The ideas here draw broadly from research in science education, teacher education, educational psychology, and education generally concerning LGBTQ students. It also draws broadly from my years of experience as an LGBTQ-inclusive life science teacher and science teacher educator. This work is inspired by the theory of sociotransformative constructivism (STC). STC "takes into account how social, historical, and institutional contexts influence learning and access to learning in schools" (Rodriguez, 1998, p. 590). LGBTQ-inclusive life science teacher education contributes to the pursuit of social justice as it broadens the understanding of whom science is meant for within a framework that encourages transformation of the systems in which science teachers learn and conduct their work.

Schools are a Hostile Environment for LGBTQ and Questioning Youth

The Gay, Lesbian, and Straight Education Network (GLSEN) has found that schools in the United States have hostile school climate towards lesbian, gay, bisexual, and transgender (LGBT) students (Kosciw, *et al.*, 2012). LGBT students begin

experiencing hostility in elementary school (GLSEN & Harris Interactive, 2012). Middle school students seem particularly at risk of increased hostility around sexual orientation and gender expression (Robinson & Espelage, 2011). In a recent GLSEN survey, 29.8% of LGBT students had missed at least a full day of school in the month prior to the survey because they felt unsafe or uncomfortable due to victimization in the form of physical assault, physical harassment, verbal harassment, and cyberbulling (Kosciw, *et al.*, 2012). In comparison, Kosciw, *et al.* (2012) found that LGBT students who experienced higher levels of victimization experienced more negative outcomes compared to LGBT students who experienced lower levels of victimization including:

- being almost three times more likely to have missed school in the past month (57.9% *vs*. 19.6%),
- being more than twice as likely to report that they did not have plans for post-secondary education (10.7% *vs*. 5.1%),
- having higher levels of depression, and
- having lower levels of self-esteem.

GLSEN's findings are based on surveys specifically focused on LGBT populations largely through their relationship with gay-straight alliances. This methodological strategy has elicited critiques regarding the validity and generalizability of their findings because their studies lack an adequate comparison group. Robinson and Espelage (2011) examined a broader set of data from a county-wide public health survey of straight and non-straight students from middle school through high school, which included students' self-identification as lesbian, gay, bisexual, transgender, and/or

questioning. Their analysis suggested that outcomes may be even more severe for middle school students and for bisexual-identifying students.

Research has not been able to explain why LGBTQ-identified students experience such harsh outcomes. Biegel (2010) suggests that, "often without realizing it, public schools are sending youth LGBTs the message, at best, that something is wrong with them, or at worst, that they do not exist" (p. 136). Many teachers overlook the possibility that they may have a student who is other than straight in their classroom (Young & Middleton, 1999). This is heterosexism and may be regarded as the result of heteronormativity, the pervasive socio-culturally constructed and systemic bias towards heterosexuality and gender binary systems at the expense of non-heterosexual and/or gender conforming people (Meyer, 2011). The tendency of textbooks to note marriage in human family trees instead of "matings" or "pairings," as is more typically represented for other animal species is an example of heteronormativity because it presumes the straight and traditional convention of marriage which, in the much of the United States, remains inaccessible to same sex couples and thus cannot be represented in this manner.

Homophobia, in contrast to heterosexism, is regarded as the person-located thoughts or actions generated from individuals' direct fear or hatred of homosexuality or people who are homosexual. Heterosexism is the individual bias towards heterosexuality. For instance, a teacher might make homophobic comments such as, "gays have no place in school," or a heterosexist comment, "the girls need to ask the guys out to the Sadie Hawkins dance." Socioculturally, homophobia and heterosexism may be thought of as the psychological, therefore individually embodied, manifestations of systemic

heteronormativity. Homophobia and heterosexism are common in education (Pinar, 1998).

Importantly, though, it is evident that the majority of LGBTQ youth are successful in school (Robinson & Espelage, 2011). GLSEN's research suggests that supportive educators, gay-straight alliances (GSAs), comprehensive bullying/harassment policies and laws that explicitly indicate protections for sexual and gender diversity, and LGBT-inclusive curriculum are correlated with better outcomes and experiences for LGBT youth (Kosciw *et al.*, 2012). No single element of this list is likely to be enough to improve outcomes for the most severely impacted LGBTQ youth. For instance, hostility and victimization, do not explain all of the variation in LGBT and questioning students' outcomes. Robinson and Espelage (2012) used multilevel covariate-adjusted models and propensity-score-matching models to compare LGBT and questioning students to other responders' risk disparities and found that LGBT and questioning-identified students were, "3.3 times as likely to think about suicide ($p < .0001$), 3.0 times as likely to attempt suicide ($p < .007$), and 1.4 times as likely to skip school ($p = .047$)" (p. 309). These findings emphasize the need for truly systemic transformation across educational and social contexts to ensure social justice for LGBTQ students. Science teacher educators should contribute to that change.

The Importance of LGBTQ-Inclusive Life Science Instruction

In a letter to the readers of the *Journal of Science Teacher Education* in 1995, Merkle called for attention to homosexual learners in science. He urged that science teacher educators' work with science teachers to reach out to gay and lesbian students by

addressing the science of homosexuality. He noted that the American Psychological Association had done so a full twenty years *prior to his writing*. Merkle commented that this silence was harmful and sent forth the following challenge to science educators and science teacher educators: "Can we create curricula that will promote open examination of this science-related issue? Can we bring this societal problem into focus for our students?" (p. 205).

Five clear arguments exist for answering Merkle's challenge. First, there is an argument for social justice. All students ought to have the opportunity to experience a safe and nurturing learning environment free from harassment and discrimination that accepts and includes them in all of their courses. It is the just and right thing for life science teachers to do (Meyer, 2011). Second, LGBTQ students are learners counted in schools and teachers classrooms like any other students. Learning outcomes for some of these students are impacted by hostile school climates. In the era of high stakes testing and accountability, life science teachers are challenged to do everything they can to improve their students' school outcomes. There is evidence that providing safe, inclusive classroom experiences for LGBT students improves their outcomes (GLSEN, 2012). Thus, establishing LGBTQ-inclusive classroom contexts may be regarded as necessary for science teachers to do their job effectively. Additionally, it is increasingly clear that school districts may face legal and financial repercussions should their teachers fail to provide safety, inclusivity, and adequate instruction for their LGBT students (Biegel, 2010). Thus, life science teachers must consider the possible financial and legal repercussions should they fail to provide for the safety and well-being of their LGBTQ-

identifying students. Further, LGBT-inclusive practices may improve relationships and trust in the classroom benefiting even straight-identified students (Sears, 1997). Finally, life and nature itself demonstrates a great range of gender and sexual diversity (this diversity is explicitly addressed later in this chapter).

Life science is a well-suited site for LGBTQ inclusion. Life science or biology is required by 16 of the 21 states which have specific science course requirements for graduation (Council of Chief State School Officers, 2008). Analysis of data from high school transcripts obtained in the National Assessment of Educational Progress indicate that general biology is taken by as many as 25% of students, which means it is taken by more high school graduates than any other science course (Berkman & Plutzer, 2011). Thus, for all students to experience LGBTQ-inclusive curriculum in science education, it is imperative that life science teachers challenge heteronormativity and gender binaries in the life science curriculum.

In addition to the high exposure rate students have to life science curriculum, life itself is highly sexualized. That is, the curriculum is already sexualized. From my earliest experiences as a science teacher educator, my secondary science candidates have commented to me about being approached by students with questions about gender and sexual activity. I point out to them that there is a picture of a penis and a vagina in almost every biology textbook and remind them that they will need to say “sex” many times when they teach the required content. Whether or not students bring these questions to life science teachers at a greater rate than other teachers is a question I cannot answer. It is plausible that the association between life science curriculum and health and sex

generates enough of a connection for many students to bring their search for answers about sex and sexuality to life science teachers.

More specifically, though, life-science curriculum is heterosexualized. For instance, though about 3.5% of Americans self-identify as LGBT, an estimate which is conservative relative to actual sexual behavior or attractions (Gates, 2012), human family trees in textbooks and biology classes do not reflect this diversity. Similarly, biological sex is oversimplified in textbooks, frequently represented as only XX or XY genotypes which simply cause male or female gender and opposite-sex attractions (Bazzul & Sykes, 2011). I acknowledge that some simplification in textbooks and curricular materials is necessary to winnow the expansive material possible in a life science course, but great caution must be taken to ensure that policy and curriculum decisions meant to reduce the quantity of content do not directly stigmatize natural sexual and gender diversity, nor make it seem shameful or taboo by seemingly ignoring it.

Despite the clear opportunities for LGBT-related topics to be addressed in the life science curriculum through health and reproduction, only 1.6% of all students surveyed in the 2011 National School Climate Survey reported this topic being addressed in science (Kosciw et al., 2012). Students reported more LGBT inclusion in history or social studies, English, health, and art than in science (though it is worth noting that overall, only 13.4% of the students surveyed reported learning about LGBT people, history, or events in any of their classes). This survey combines life science classes with all other science classes, but I suggest this provides an indicator that life science teachers are

infrequently addressing LGBT topics in class, or at least not to an extent that students are aware of them.

Life Science Teacher Educators Should Make Their Curriculum LGBTQ Inclusive

Life science teachers, like other teachers, draw from their experiences as students to shape what they do as teachers (Lortie, 2002). This is problematic because, as already noted, science learners are unlikely to experience LGBT-inclusive classes (Kosciw, *et. al*, 2012). Science TCs, like other TCs, are also unlikely to learn about LGBTQ-related topics during their educator preparation. Lipkin (2004) states, "[w]hen it comes to readying educators to deal effectively with lesbian, gay, bisexual, and transgendered[5] (lgbt) [*sic*] students, there is virtual silence – few public demands and little reform of undergraduate and graduate curricula" (p. 2).

A general survey of teacher education programs indicated that 40% of teacher education programs do not address sexual orientation at all during their programs (Sherwin & Jennings, 2006). It was the least frequently addressed measure of student diversity behind race, special needs, language, class, and gender. Quinn and Meiners (2011) attribute this lack of LGBTQ inclusion, despite over twenty-five years of scholarly work regarding its value when present and harm when absent in education contexts, to larger existing systems of power and privilege within the teaching profession.

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[5] Transgendered is neither grammatically correct nor considered respectful. The correct word is "transgender."

They suggest that teacher educators themselves take up more relevant and urgent topics like LGBTQ-inclusion in their classrooms and research.

There is a long, though quiet, history of science teacher educators encouraging this transformation. Merkle (1995) encouraged science teacher educators to alter their own curriculum as they train science teachers to be more inclusive of non-straight students almost twenty years ago. The call of hegemony in science teacher education can be strong. Fifield, a professor of science teacher education and a gay man himself, shared his experience teaching a science methods course (Fifield & Swain, 2002):

> At a gut level I believed that it was right to address issues of sexuality with future science teachers, but I knew of nothing in the science education literature that would authorize my beliefs or guide my instruction. I worried about my credibility with students if I stepped beyond the boundary of official knowledge… in science teacher education. (p. 179)

As is often the case in classrooms, he, Fifield, had not realized that there was a gay science teacher candidate, Swain, in his class struggling to navigate his sexual orientation in the context of teaching high school. Swain decided not to pursue teaching as a career stating that, "[g]iven the current realities of high school teaching, a career in undergraduate student affairs is more appealing" (Fifield & Swain, 2002, p. 185). Would LGBTQ inclusion have changed Swain's decision? It's impossible to know. Certainly, though, this story suggests the potential for lost opportunities in expanding and diversifying the science teacher workforce that science teacher educators may be complicit to.

LGBTQ-inclusive Life Science Teacher Education

Curriculum-wide changes are most likely to result in the dispositional change necessary to encourage real change in classroom practices. As Banks (1993) explains about multicultural education, simple one-shot lessons about diversity are not effective interventions and may actually do more harm than good as they still cast the non-dominant group, LGBTQs, as the "other" who brings "extra" content to a discipline. However, Ngo (2003), drawing from discursive theories, indicates that even small changes may be worthwhile as efforts such as these "are still supplementing students' understandings of gender and sexuality" (p. 122). I argue that we must move from the theoretically idealistic into the pragmatic. I assert that the cutting edge of theory or heralding calls for reform are of little value to present-day faculty, teachers, and students until someone puts that thought into action. If an error or misstep is made, the effort nonetheless begins and supports the transformation. The following section includes specific suggestions for a science teacher education curriculum that interrupts heteronormativity and its harms. The suggestions that follow should not be regarded as prescriptive or in any way comprehensive as community and programmatic differences necessitate that science teacher educators in different settings select strategies that are likely to be effective in their specific contexts.

Setting the Stage

Preparing life science TCs to be ready to learn about LGBTQ inclusion and its significance in their classrooms need not begin in a manner that is unique to science contexts. Sadowski (2010), a teaching methods instructor, suggests that TCs'

commitment to support LGBT students may be best introduced by having teachers reflect on their own educational core values such as equity, social justice, or even democracy and then presenting data on in-school victimization of LGBT students and their associated effects on LGBT students' academic and health outcomes. Meyer (2011) highlights the role of broad theories of education in framing the importance of inclusion of gender and sexual diversity in schools by exploring in depth its relationship to democratic theories of education, critical pedagogy, feminist pedagogy, multicultural education, social justice, anti-oppressive education, and queer pedagogy. Queer pedagogy is especially salient in LGBTQ inclusion as it seeks to embrace the dynamic, fluid, and complicated nature of biology and being human (Broadway, 2011).

This connection between theories and LGBTQ inclusion may be reinforced for TCs by presenting the link between full curricular inclusion of LGBT content and improved outcomes for LGBT students (Kosciw *et al*., 2012). Further, Lipkin (2004) suggests that "presenting homosexuality without embarrassment or condemnation evidences a teacher's acceptance of sexuality in general and that signal may facilitate better communications with all students" (p. 200). He also discusses how heterosexual students benefit from reduced fear and anxiety about their own feelings of closeness towards others of the same gender.

Addressing LGBTQ Inclusion and Religious Concerns

Life science teachers must be prepared for responding to religious diversity in their classrooms such that they can teach many elements of their content which may raise negative responses from religiously fundamentalist students and their families. While

students and parents have a right to express their views about same-sex relationships and marriages, science teachers have a responsibility to ensure that all of their students are accepted in their classroom. I urge science teacher educators to apply the similar pedagogical thinking and strategies that they use to help their TCs understand how to attend to religiously-based conflict about evolution by natural selection to their instruction related to LGBTQ inclusion. Certainly, the teacher educator may need to provide additional assistance to TCs who themselves believe that their religious views are in conflict with LGBTQ inclusion. It is likely that, just as teachers have difficulty teaching evolution if it conflicts with their religious views (Akyol, Tekkaya, Sungur, & Traynor, 2012), they may experience a similar difficulty with LGBTQ inclusion if they believe it conflicts with their religious views. I suggest emphasizing the five arguments presented earlier for why LGBTQ inclusion ought to be considered part of the life science teachers' job: it's just; it's likely to improve LGBTQ students' learning; not doing so may yield legal repercussions; it's likely to improve relationships in the classroom for all students; and, life and nature itself is highly diverse in regards to sexual orientation and gender. My experiences as an LGBTQ-inclusive science teacher and teacher educator responding to religious-based concerns have been largely positive once clear reasons for my pedagogical decisions have been clearly expressed.

Pitfalls to Consider

My experiences as a teacher educator suggest that life science TCs may be hesitant to engage in diversity topics because they worry about saying the wrong things and offending the very students they are hoping to help. The best way for science teacher

educators to become aware of the general pitfalls and biases associated with addressing LGBTQ topics is to attend a Safe Space workshop or similar program whose goals are to increase awareness and respect for LGBTQ populations. Many college campuses offer these programs through their offices of student diversity. Science teacher educators are encouraged to reach out to other methods instructors to ensure that their programs are providing the essential vocabulary and knowledge from which their candidates will be able to begin working with LGBTQ populations.

Further, non-heterosexual or non-gender conforming identities ought to be discussed as naturally occurring differences and never as pathologized abnormalities (Mohr, 2008). For life science TCs, this suggestion is especially relevant as biology textbooks often speak of "chromosomal abnormalities" rather than differences. Calling science teachers' attention to this critically by specifically encouraging them to change their language will benefit LGBTQ students, their friends, and families, but also students whose lives are touched by chromosomal differences. For example, trisomy-21 and Klinefelters syndrome should not be addressed in unique ways, as there ought to be nothing more or less embarrassing about a trisomy of the sex chromosomes than of any other chromosomes. These syndromes, often referred to as intersex conditions though intersex refers to more conditions caused by differences of the sex chromosomes, ought to be addressed with sensitivity on the teacher's part with the teacher demanding respectful language from their students. Oversimplification should be avoided. Just as Trisomy-21 impacts individuals differently, chromosomal differences of the sex chromosomes also impact individuals differently. Students may respond to learning about

chromosomal sex differences with statements such as "does that relate to being gay?" A short answer I utilized was "no more than being human relates to being gay."

Similar reactions may be anticipated when discussing earthworms. For instance, when students encounter the term hermaphrodite, which refers to organisms with both male and female sex organs, they may ask if transgender people are hermaphrodites. This is a misconception as there is not a simple biological explanation for transgender identity. It is important that science teachers are ready to lead their students in learning activities that will help them differentiate between sociocultural (*e.g.*, transgender) and scientific (*e.g.*, hermaphrodite) words. Discussions of human developmental biology may help students understand the process by which humans develop ovaries, testes, or, in very rare cases, both (see Modan-Moses, Litmanovitch, Rienstein, Meyerovitch, Goldman, & Aviram-Goldring, 2003).

Classroom Leadership and Management

Life science TCs should anticipate and thus be prepared to respond to student discourses that reveal heterosexism and homophobia. They, like all other teachers, must practice addressing bullying language and specific harassment of LGBTQ students. Some attention has now been given to students' use of the term "gay" in a derogatory manner (Meyer, 2011) prompting responses such as GLSEN's "ThinkB4YouSpeak" campaign. As discussed previously, life science TCs' inclusion of LGBTQ students ought to go beyond simply responding to students' negative comments. Zack, Mannheim, and Alfano (2010) identify four archetypal responses to homophobic rhetoric typical of classroom teachers: those who avoid the conversations because they feel uncomfortable with the

topic; those who felt driven to action, but felt they lacked the skills to intervene; those who felt confident and equipped to confront students' biased remarks directly; and, those who proactively reframed classroom spaces through integrating LGBT topics into their curriculum. These four responses represent various levels of skill, comfort, and willingness to respond to students' homophobic comments. Though this does not focus on life science TCs specifically, understanding these types of responses may assist the science teacher educator in anticipating and responding to science teachers' reservations about responding to heterosexism and homophobia in the classroom to encourage more teachers to directly take action in the pursuit of generating a positive classroom cultures.

Student group assignments are another classroom management topic that life science TCs should deliberate. For instance, life science TCs should have the opportunity to discuss the potential problems with group assignments based solely on gender. One trouble with sorting students in this manner is that it reinforces the sociocultural and biological gender binary. Additionally, sorting students in this manner forces them to identify their gender to others (or have it identified by others) creating a potential cascade of "outing" non-gender conforming students. Finally, sorting students based on one biologically determined characteristic sets-up students to pit their traits *vs*. those of others. Would a science teacher think it appropriate to face-off student groups along the characteristics of black *vs*. white; light eyed *vs*. dark eyed; or short *vs*. tall? I certainly hope not. Male *vs*. female groups should be similarly unthinkable. Science teacher educators may encourage more pedagogically meaningful group determinants based on student interests, classroom participation, and/or achievement.

While the examples above are relevant to all teachers, life science TCs are likely to encounter unique curricular-related opportunities to set an inclusive and accepting classroom environment. In these cases, the teacher ought to anticipate the potential bias and be proactive. For instance, some lab activities may produce opportunities for homophobic remarks such as a lab exercise that model genetic inheritance requiring students to pretend to be "male" or "female" parents. Similarly, the Latin prefix "*homo*" often generates snickers from students *(e.g*.. homozygous and *Homo erectus*) because of the homophobic-based discomfort with the term homosexual. A positive, example I have seen a teacher candidate use is matter-of-factly reminding students that the prefix "*homo*" means "same" in these instances just as it does in the word "homosexual." If students respond negatively, a direct discussion about acceptance and inclusion of LGBTQ people is warranted.

Scientific Inquiry, Engineering, and Scientific Practices

The NRC has recently shifted from emphasizing scientific inquiry to emphasizing scientific and engineering practices. This change is intended to further broaden teachers' and students' grasp of the breadth and flexibility of the work which scientists and engineers engage in with the hope that, "the actual doing of science or engineering can pique students' curiosity, capture their interest, and motivate their continued study" (National Research Council, 2012, p. 43). The *Framework for Science and Education* clarifies this change:

> The focus here is on important practices, such as modeling, developing explanations, and engaging in critique and evaluation (argumentation), that have

> too often been underemphasized in the context of science education. In particular, we stress that critique is an essential element both for building new knowledge in general and for the learning of science in particular […]. Traditionally, K-12 science education has paid little attention to the role of critique in science. However, as all ideas in science are evaluated against alternative explanations and compared with evidence, acceptance of an explanation is ultimately an assessment of what data are reliable and relevant and a decision about which explanation is the most satisfactory. (p. 44)

The notion of critique is clarified further:

> […]inherent to this evaluation of explanations against evidence is that educational efforts will help students become critical consumers of science and the products of engineering, whether as a lay citizen or a practicing scientist or an engineer, also requires the ability to read or view reports about science in the press or on the Internet and to recognize the salient science, identify sources of error and methodological flaws, and distinguish observations from inferences, arguments from explanations, and claims from evidence. All of these are constructs learned from engaging in a critical discourse around texts. (p. 75)

Science teacher educators may model critical discourse around texts through the analysis of heteronormativity in the curriculum materials readily available in their classrooms. Critical analysis might include discussion questions: Who is being left out of science? What impacts can heteronormativity have on science research? For instance, consider the Laysan albatross long studied by scientists who never realized

that many of the nesting pairs were female-female as they sought complicated other theories to explain how birds who could not physiologically lay two eggs often sat upon nests with two eggs (Young, Zaun, & Vanderwerf, 2008). In such cases, human bias has stymied accurate scientific understanding. This pedagogical approach empowers students as it, in the words of Snyder and Broadway (2004):

> […]places the students into the real world of science-in-the-making and teaches them to broaden their approach on analyzing controversial topics that require a scientifically literate populace to influence policy. Science as inquiry extends students' views beyond the 'what' of science and transports them into science that is fallible, self- correcting, and progressive. (p. 632)

LGBTQ-Inclusive Life Science Content

This section emphasizes the particular curricular opportunities life science TCs have to create LGBTQ-inclusive classrooms. The teacher educator has an important role to play in encouraging life science TCs to recognize these opportunities because, at present, few textbooks presently address them.

Nature and history of science. The history of science is full of scientists whose personal lives have been erased or quietly disregarded due to their sexual orientation or gender expression. For instance, Merkle (1997) recommended including more details about the personal life of Sir Francis Bacon who is often thought of as the "father" of modern scientific thinking. Other famous LGBTQ scientists and engineers include Alan Turing, Alexander von Humboldt, Rachel Carlson, Sally Ride, and Margaret Mead. The Equality Forum (2011) provides an extensive list of LGBT biographies as part of its

"LGBT History Month," observed each October. Science teachers may engage students in thinking about how science and engineering may be impacted by the exclusion of people with certain characteristics.

Animal diversity and behavior. There are numerous examples of same-sex mating behavior across many non-human animal species including African bat bugs, bonobo chimpanzees, bottlenose dolphins, common toads, garter snakes, and fruit flies (Bailey & Zuk, 2009). This calls into question the traditional assumption that "mating" or "sexual behavior" is just for "reproduction" as there is evidence that there are other selective pressures contributing to the evolution of same-sex sexual behavior. (Note that lesbian, gay, bisexual, transgender, and queer apply to human identities not animal behaviors).

The book *Gay, Straight, and the Reason Why: The Science of Sexual Orientation* by Simon LeVay (2011) provides an overview of scientific theories explaining sexual orientation among humans including *in utero* exposure to varying levels of steroidal hormones, childhood experiences, genetics, and structural differences in the human brain. Critically, science teachers may be encouraged to address how scientific research about sexual orientation and gender diversity is presented in the general media with their students.

Heredity and genetics. Life science teachers may examine sex chromosome combinations and the traditional male/female binary taught about the X and Y chromosome as their students learn to make a distinction between "sex" (*e.g.*, male/female/intersex) as biologically determined and "gender" (*e.g.*, man/woman,

boy/girl, and/or genderqueer) as socially constructed (Meyer, 2011). This leads readily to discussions about the role of environment in the phenotypic expression of genetic variations (Kumashiro, 2004). Such questioning could be extended to research about gender expression and acceptance of gender and sexual diversity in other cultures. For instance, students could learn about the two-spirit identity, those who are have both the spirit of men and women, among some Native American people (Jacobs, Thomas, & Lang, 1998).

Additionally, life science teachers could lead class discussions about the persistence of the sexual binary despite the scientific complexity of chromosomal differences *i.e.*, XO, XXY, XXX, and so forth (Kumashiro, 2004). Similar consideration could be given to why genes carried on the X-chromosome are called "sex-linked traits" instead of "X-chromosome linked traits." Terms such as "male pattern baldness" which may affect women and intersex individuals are similarly problematic and could be addressed.

Cellular and molecular biology. Spanier (1995) noted how scientists had labeled *E. coli* with plasmids "male" and those without them "female." When learning about cells, the mitochondria—often thought of as the power-plant of the cell—is often noted as being of "maternal" ancestry. Science teachers may lead students in discussions about what it really means for molecules to be maternal or sexed at all.

Epidemiology. I suggest inquiry into the history of public health by studying the emergence of the AIDS epidemic and the role that wide-spread homophobia played in researching and responding to the disease (Britzman, 1995). Several books detail these

events including *Science Fictions* by John Crewdson and *And the Band Played On* by Randy Shilts. For a more modern example, students could critically examine the persistence of a policy from 1983 which prevents men who have ever had sex with a man since 1977 from donating blood even as the American Red Cross indicates the policy should be changed (Associated Press, 2007). Classroom discussion could be prompted by questions such as: How are LGBTQ people affected by this policy? How is the general public affected? Is the policy scientifically justified?

Endocrinology. Teacher educators may bring in texts or sections from medical books which discuss the role of estrogen and testosterone in the human body and compare those to how the same molecules are discussed in secondary life science textbooks. Nehm and Young (2008) completed a detailed analysis of commonly used secondary life science textbooks finding that they reinforce misconceptions about gender binaries that are not scientifically accurate. Why do textbooks for secondary students edit, reduce, or simplify the varied tasks these proteins perform in human bodies? How do these representations contribute to scientific misconceptions of sex and gender? How might those misconceptions affect LGBTQ and non-LGBTQ people?

Human reproduction. My experience as a science teacher and my experiences as a science teacher educator indicate that students frequently bring questions about sexually transmitted illnesses and human reproduction to biology teachers. While these topics are often addressed in secondary health classes, science teacher educators should make it clear to life science TCs that these topics are likely to be raised in classroom discussions or by students approaching the teacher individually. The science teacher should be

prepared to respond with medically and scientifically accurate information and should be comfortable referring students to additional resources in a non-judgmental manner.

Professionalism and School Policies

Science teacher educators should help candidates evaluate their local context and understand how their teaching practices may be impacted by contextual factors. I suggest that early classroom observation experiences in school placements engage candidates in the examination of their local school policies and practices in regards to LGBTQ students. Do school policies explicitly protect or discriminate against LGBTQ students? Do school climate and satisfaction surveys ask about the experiences of LGBTQ students? Does the school have a gender and sexuality or gay-straight alliance (often called GSAs)? How does the school respond to students who dress in non-gender conforming ways (*e.g*., boys in skirts and/or girls in neck ties)? How does the cooperating teacher engage with LGBTQ students and homophobic behavior in the classroom? Are there "LGBTQ safe space" signs around the building? Are single-person, all gender bathrooms available for student use in the building? There may be a high degree of variation between school districts and the schools within them. In the worst case, policies may exist which seek to prohibit the discussion of homosexuality in a positive manner such as a policy in the Merrimack School District in New Hampshire, which was later repealed. A similar policy in the Anoka-Hennepin School District in Minnesota vaguely instructed teachers not to discuss sexual orientation. It, too, was revoked amid disturbing student outcomes, lawsuits, and legal action on the part of state and federal agencies. Ultimately, the United States Department of Justice required that the district

hire an equity coordinator and a Title IX coordinator to oversee its reparative efforts, offer training for students and staff, and designate liaisons in each secondary school (Baca, 2012).

Special Considerations for LGBTQ-Identified Teacher Candidates

Along the vein of professionalism, it is likely that LGBTQ TCs may need special assistance as they debate whether or not to be "out" as a science teacher. I encourage science teacher educators to directly support LGBTQ-identified candidates as they make that decision. Many factors ought to be considered, including the standards in the local community; local school board policies; state laws regarding protections for sexual orientation and/or gender expression in the workplace; and regard for distinctions between laws that protect private school employees *vs*. public school employees (Biegel, 2010). Science TCs should consider the potential psychological and financial impact of coming out as *de jure* protections cannot ensure complete *de facto* safety and security. Further complicating the decision, the potential psychological and relational harm of being closeted should also be considered. The book *One Teacher in Ten* by Kevin Jennings has proven helpful to LGBTQ-identified TCs I have taught.

Final Thoughts on LGBTQ Inclusion in Life Science Teacher Education

Science teacher educators need not work alone in their efforts to improve educational outcomes for LGBTQ-identified students. Working with other teacher education professionals in their institutions who contribute to their science TCs' experiences is necessary to ensuring preparation for LGBTQ-inclusive practice. For instance, foundations of education courses including adolescent and developmental

psychology and the history and anthropology of schooling provide numerous opportunities for teacher educators to work together. Science teacher educators are likely to discover that some LGBTQ inclusion is already occurring in other courses their science TCs are taking during their preparation for practice. This should not be considered a release from responsibility for the science teacher educator to address LGBTQ inclusion as these courses are likely to address the needs, experiences, and resiliencies of LGBTQ-identified people in a general manner. Life science TCs are likely to benefit from particular guidance in their own discipline so they are able to recognize opportunities for LGBTQ inclusion specific to their future classrooms. Further, avoiding diversity topics such as LGBTQ inclusion in science education methods courses directly may send the message to science TCs that such topics and practices are irrelevant or inappropriate to be included in their discipline.

While this chapter focuses on life science TCs, many of the recommendations presented are relevant to physical science TCs, too. For instance, LGBTQ inclusion in the history and nature of science, classroom leadership and management, and school policies apply to all science teachers. Similarly, while it focuses on science teacher candidates, the ideas here may be appropriate for professional development programs to assist practicing science teachers' development of LGBTQ-inclusive practices.

Quinn and Meiners (2011) emphasize that the problem for teacher education in regards to interrupting heteronormativity, responding to homophobia, and ensuring social justice for LGBTQ students is less about what we do not know and more about what we do not do, suggesting a need to examine policies and practices which prevent teachers

from establishing inclusive classrooms. Within science teacher education, though, hegemony appears even stronger. The amount of research relating to LGBTQ topics and people in science education is very limited. This may reflect what Lemke (2011) refers to as the generally masculine and politically conservative nature of science education.

Research is needed in science education and science teacher education to illuminate a path through the *status quo*. What practices are science teacher educators already engaging in related to LGBTQ inclusion? How do science teachers respond to students' heteronormative questions? What affective and structural supports and challenges exist in regards to science teachers' manifestation of LGBTQ-inclusive practices? Do LGBTQ-inclusive science classrooms affect student learning for LGBTQ-identified students? For non-LGBTQ students? How do intersections of LGBTQ-identities and other identities affect learning science? Even more basically, how can we know about the effects of any curriculum on LGBTQ students while test designers, school districts, and the United States Census resist counting LGBTQ individuals at all despite growing psychometric evidence that LGBTQ people require special consideration and support?

While there is much more to do and understand, science teacher educators cannot sit idly by waiting for complete clarity to spring up whole, unified, and simplified. Lemke (2011) suggests in his response to Bazzul and Sykes' (2011) analysis of textbooks that education researchers move beyond simply recognizing the problems like heteronormative biology textbooks and complacent science teachers. He charges that doing so is an

> […]indication of a kind of collaborationism in our silence on controversial issues that are basic to both our science and our students' lives. Do we choose to see science teachers as merely employees of the state, shoveling whatever beliefs and values are politically dominant over the desk of our students? Or are we as educators, by longstanding Western tradition, advocates for students and opinion-leaders in our communities? (p. 292)

Amidst a wave of change in public sentiment in regards to diversity in sexual orientation and gender non-conformity, the end of the American military's policy of "Don't Ask, Don't Tell," and ever increasing numbers of states permitting same-sex marriage, perhaps there is reason to be optimistic. It is ironic that much of the progress in legal standing for LGBTQ people has been made through arguments based in the life sciences even as science teacher educators, the life science curricula, and life science standards continue to be silent in regards to this natural aspect of the diversity of life.

The existent community of pedagogues who have made their science teacher education programs LGBTQ-inclusive must share their experiences. For many life science teachers, public silence and quiet classroom resistance, even though they act within the realm of right, legal, and/or best practice, is still felt necessary to protect one's personal and/or financial safety. They need the support of their teacher educators to navigate this terrain and publically advocate for LGBTQ-inclusive practices. I hope these voices will find a venue to be heard so that all those who struggle to support their own and their students' realization of their full humanity may be shared with others seeking to do the same.

Chapter 4: Science Teacher Candidates' Commitments to and Enactments of LGBTQ Inclusion

Growing awareness about the disparities between the educational experiences of lesbian, gay, bisexual, and transgender LGBT people and their non-LGBT-identified counterparts has prompted the U.S. Department of Education (2014) to clarify protections for LGBT students under Title IX explaining that

> Title IX's sex discrimination prohibition extends to claims of discrimination based on gender identity or failure to conform to stereotypical notions of masculinity or femininity and OCR accepts such complaints for investigation. Similarly, the actual or perceived sexual orientation or gender identity of the parties does not change a school's obligations. Indeed, lesbian, gay, bisexual, and transgender (LGBT) youth report high rates of sexual harassment and sexual violence.

Citing similar reasons, the Council for the Accreditation of Educator Preparation (CAEP, 2013) to clarify that all P-12 students is

> defined as children or youth attending P-12 schools including, but not limited to, students with disabilities or exceptionalities, students who are gifted, and students who represent diversity based on ethnicity, race, socioeconomic status, gender, language, religion, sexual identification, and/or geographic origin.

However, research that describes these inequities and opportunity gaps remains relatively sparse though it is clear that LGBT and questioning learners experience increased absences, lowered grade point averages, concerning rates of suicidal ideation, and

reduced interest in pursuing secondary education (Kosciw, *et al*., 2012; Robinson & Espelage, 2011, 2012). Some research has demonstrated correlations between supportive educators and LGBT-inclusive curriculum and better outcomes for LGBT-identified students (Kosciw, *et al*., 2010; Kosciw, *et al*., 2012).

Science teachers, like other teachers, draw from their experiences as students to shape what they do as teachers (Lortie, 2002). This is problematic because LGBT-inclusive curriculum is uncommon in secondary science classes (Kosciw, *et al.,* 2012). Thus, science TCs are unlikely to have had experiences of LGBT-inclusive science learning experiences from which to shape their own practices. Teacher education programs are expected to fill in the gaps in teacher candidates' prior learning about what TCs experienced as learners and what they need to know to be prepared to be educators. However, a survey conducted by Sherwin and Jennings (2006) found that fewer than half of education programs address sexual orientation. Those programs that did, largely addressed the topic in common content courses. They concluded that teacher candidates were less likely to learn about diversity of sexual orientation than diversity based on race, special needs, language, class, and gender.

Though no studies have attempted to quantify the inclusion of lesbian, gay, bisexual, transgender, and queer (LGBTQ) topics in SEPPs, there is a history within the science teacher education community of demands to address such topics (Merkle, 1995, 1997; Fifield & Swain, 2002). Kumashiro (2004) and Meyer (2010) provided some examples of curriculum that addressed LGBTQ topics in the sciences. Heteronormativity in science curriculum has been discussed by Letts (1999) and Snyder and Broadway

(2004). Suggestions for LGBTQ inclusion in life science teacher education were provided in Chapter 3 integrating these ideas and others.

As policy demands and awareness about the needs of LGBTQ-identified students grows, it is important for SEPPs to understand the effects of their programs on TCs practices. This study describes a SEPP's efforts at developing TC's LGBTQ-inclusive praxis. This multiple case study focused on three research questions:

1. What were science TCs' commitments to LGBTQ-inclusive praxis?
2. What were science TCs' enactments of LGBTQ-inclusive praxis?
3. What supports and barriers influenced TCs' commitment to and enactment of LGBTQ-inclusive praxis during the SEPP?

Theoretical Framework

This study is primarily guided by Rodriguez's (1998) theory of sociotransformative constructivism (STC). Rodriguez refers to STC as an "orientation" towards teaching and learning for social justice. I refer to it as a theory about teaching and learning for social justice. STC guided both the design of this research and the analysis of data.

Sociotransformative Constructivism

STC combines multiculturalism as a theory of social justice (Banks, 1993, 1995) and social constructivism as a theory of learning (Bakhtin, 1981; Vygotsky, 1978). Multicultural education was developed from ethnic studies and African American studies in particular (Banks, 2007) to address racial inequities in education. Over time, multicultural education has been expanded to include other axes of diversity for which

educational inequities are experienced including around sex, culture, physical and/or learning ability, English language learning status, and socio-economic status to promote more equitable learning opportunities for diverse students. As research has emerged clarifying the health and learning disparities between LGBT and questioning learners and their counterparts, multicultural education has been expanded to include gender and sexual diversity (Meyer, 2010; Mayo 2014).

STC was compelling as a theoretical frame for this study due to its potential to clarify best practices for preparing future teachers to go beyond teaching for understanding in a business-as-usual manner and emphasize diversity in their teaching in the pursuit of social justice. Rodriguez (1998) explains STC expands the teacher educator's

> repertoire of concrete strategies for meeting the challenges of learning to teach for diversity and understanding. Learning to teach for diversity implies learning to implement more culturally inclusive and socially relevant pedagogical strategies. Learning to teach for understanding involves learning to implement more critically engaging and intellectually meaningful pedagogical strategies. Hence, learning to teach for diversity and understanding cannot exist one without the other if equity and excellence are the goals of education reform. (p. 590)

Central Pedagogical Elements of STC in Teaching and Learning

STC suggests four closely linked pedagogical elements to teaching and learning: the dialogic conversation, authentic activity, metacognition, and reflexivity (Rodriguez, 1998). Each of these pedagogical elements is described in detail below.

The dialogic conversation. The dialogic conversation may be understood as a pedagogy of deep-sense making between speakers. In contrast to a traditional conversation in which individuals communicate surface level details of events or ideas, the dialogic conversation goes beyond the routine by requiring each speaker to position their identities and experiences in the conversation to understand the societal discourses of power and privilege that are behind what each speaker is saying, what they are not saying, and why. Examining the power and privilege contributing to the conversation demands a high degree of trust (Rodriguez, 1998).

Authentic activity. Theories of learning suggest engagement in activities that are as near as possible to the "real activity" of the day-to-day activities of people in the world promotes learning (Newmann, 1993). Rodriguez (1998) places authentic activity within STC explaining that

> [l]earners must be provided with opportunities to engage in activities that closely resemble those commonly carried out by practitioners in the community of practice of the subject under study. This notion is congruent with current science education reform initiatives. While it is true that lack of resources, distance, and other constraints may conspire against providing authentic opportunities for students to learn, imagination must prevail. This is where students' diverse backgrounds and abilities can also be used as tools to enhance learning by allowing them to contribute their expertise and ideas through role-playing, group research projects, and so on. (p. 600)

For TCs learning to teach for diversity, authentic activity may be understood as supporting the development of equitable teaching practices through role playing, case studies, and, as much as possible, during their field placement experiences.

Metacognition. Metacognition refers to thinking about one's thinking, in particular thinking about how and why one thinks and acts as one does (Metcalfe & Shimamura, 1994). STC expands the concept of metacognition as being necessary to develop the deeper form of critical engagement the TC has with their thinking about their practice and why they are thinking those ways. In this manner, metacognition is fundamental to praxis. Rodriguez (1998) clarifies:

> [b]y 'deeper' and more 'critical,' I do not just mean in the sense of developing higher-order learning skills. In this case, I am referring more to the process of developing a sense of consciousness and agency on one's own ways of learning [to teach]. (p. 600)

Reflexivity. Reflexivity focuses on the development of awareness of individuals' social, ideological, and academic location within a learning space (Rodriguez, 1998). Making these sociological locations evident permits the TC to examine what they consider as important for their students to learn and why thus permitting them to realize a greater set of possibilities for learning. Rodriguez (1998) discusses the role of reflexivity in teaching about science as

> a discussion of how science knowledge is produced and reproduced, who are (were) recognized as scientists, how their work influences society at large, and how social issues determine which scientific work is worth funding. Therefore,

> reflexivity opens a window for students and teachers to examine the culture of power and explore ways to transform it for the benefit of all and not just the privileged few. (p. 601)

The Centrality of Context and Power in Developing LGBTQ-inclusive Praxis

STC's emphasis on social contexts inherent in the dialogic conversation, authentic activity, metacognition, and reflexivity embeds it in the examination of systems of power. Rodriguez states, "power […] is a central construct in STC—power is the currency of social change" (p. 599). Social change is needed here to challenge the existing traditional science curriculum that has been silent in regards to gender and sexual diversity. Praxis is "reflection and action upon the world in order to transform it" (Friere, 1970, p. 33). Science TCs' adoption of LGBTQ-inclusive praxis is viewed as necessary to empower them to transform science classroom learning experiences. Although Rodriguez does not explicitly address Friere's notion of praxis nor gender and sexual diversity, STC is a theory of learning that is conducive to the development of the science TC's commitments to and enactments of LGBTQ-inclusive praxis.

Understanding the development of TC's LGBTQ-inclusive praxis requires the examination of power within the systems in which the participants in this study were learning to teach science as they traversed the spaces of their own experiences learning science as students, their coursework in their EPP, and their field placement experiences in classroom contexts which varied considerably in terms of their readiness to welcome LGBTQ-topics and people.

Understanding this "readiness" for LGBTQ-topics and people was aided by the use of Elia and Eliason's (2010) "Continuum of LGBTQ Inclusion*,"* presented in Table 4.1. This continuum describes five levels of LGBTQ inclusion from LGBTQ hostile to LGBTQ integrated. This continuum discusses the differences in these levels in terms of policies, climate for LGBTQ-identified individuals, the formal curriculum, and the hidden curriculum. This continuum was developed as a tool to evaluate sexual health curriculum in regards to LGBTQ inclusion. Though it has had limited use in empirical studies, I have found it to be a helpful tool to examine LGBTQ inclusion beyond its simple presence or absence in educational settings.

Methods

This study was designed as a holistic multiple-case study. Yin (2009) indicates that holistic designs are appropriate when rare or unique phenomena are studied. The unit of analysis in this study is science TCs' LGBTQ-inclusive praxis. The purpose of the study is to describe these phenomena in terms of the commitments to and enactments of four participants selected because of their unique characteristics and contexts and how the individual cases contribute to a more complete understanding of science TCs' LGBTQ-inclusive praxis. The four cases in their unique contexts justify the multiple-case design. This study is bound to one Midwestern science EPP. The details of the bounds of the case are described in more detail later in the methods.

Table 4.1

Continuum of LGBTQ Inclusion

Level	Policies	Climate	Formal Curriculum	Hidden Curriculum
LGBTQ Hostile	None that protect, may have discriminatory policies	Allows or encourages discrimination, harassment; punishes LGBTQ who are out	None, or negative	Blatantly heterosexist, exclusionary
LGBTQ Invisible	Policies do not name LGBTQ	May not allow derogatory, discriminatory behavior, but do not name it as LGBTQ-oppressive	None	Heterosexist
LGBTQ Tolerant	May have some policies to protect, but often not enforced	LGBTQ do not feel safe to be out due to inconsistent climate	Acknowledge presence of LGBTQ, but do nothing to be inclusive	Heterosexist
LGBTQ Accepting	Most policies protect LGBTQ	Do not allow derogatory comments or discrimination	LGBTQ included in curriculum, but in segregated manner	Supports GSAs, PFLAG, Safe Zone, etc.
LGBTQ Integrated	All policies are inclusive and protective	Students and community are educated on why harassment/discrimination occur and why it is wrong	LGBTQ people and issues are found throughout the curriculum, integrated	All school functions are safe and inclusive

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer. Reprinted from "Discourses of Exclusion: Sexuality Education's Silencing of Sexual Others," by J. Elia and M. Eliason, 2010, *Journal of LGBTQ Youth*, *7*, 29–48. Copyright Journal of LGBTQ Youth. Adapted with permission.

Positioning the Author

I wish to position myself in this work. I refer to myself directly within this study. I completed the science EPP in which I was researching and teaching not even a decade earlier. My boss, the methods instructor, had been my supervisor when I had been a TC. I was the researcher, a contributor to the common content course curriculum that addressed LGBTQ topics, and a guest speaker in the secondary science methods courses in regards to LGBTQ inclusion. For some of the TCs, I was also their supervisor visiting and observing their teaching in middle school and/or high school field placements; their professional learning community (PLC) facilitator in the historical, anthropological, and sociological foundations of education (HASE) course and/or their instructor in a course on equity and social justice. Thus, my position in the study was thoroughly integrated. I worked closely with the TCs who participated in the study throughout their EPP experience. My history with the program and positions in the program granted me an existing framework of trust, which made this work possible. As Mertens (2009) explains, "transformative epistemology is characterized by a close collaboration between researchers/evaluators and the participants of the study" (p. 56).

Given the subject and focus of this work, it is noteworthy that I also position my identity as openly bisexual and queer. I have been a community organizer in queer spaces throughout my adult life.

Participants

Six TCs participated in the full data collection in the larger research endeavor in which this study is embedded. Four were chosen for the focus of this study to capture the

range of the science TC's commitments to and enactments of LGBTQ-inclusive praxis. The two TCs who were not included in this analysis had very similar experiences to the candidates who were included thus their cases did not broaden the understanding intended by this study. Two of the four candidates included in this study volunteered to participate after learning the generalities of the study from me in one of their courses. The other two participants were approached individually based on my knowledge of their potentially more unique perspectives and experiences. All of the candidates were initially informed that the study focused on how the science EPP prepared teachers for their future work with diverse students upon the recommendation that this would enable a potentially less biased initial interview with the candidates. All of the TCs were informed that work with LGBTQ students and the generation of LGBTQ-inclusive teaching practices was the primary focus of the study before they formally consented to participation in the study.

The TCs all identified as white and middle or upper-middle-class. Two identified as male and two identified as female. Three identified as straight and one identified as gay. Two of the candidates were seeking licensure in life science, one sought a chemistry license, one sought both a chemistry and life science license, and all the TCs had completed undergraduate degrees in the sciences. One candidate was also seeking the middle school license. Prior to enrolling in the program in the pursuit of licenses to teach secondary science, one had pursued higher education in nutrition research, one had been enrolled in medical school, one had been a full time mom, and one had worked in a business field. The candidates had differing experiences with diverse people, LGBTQ-identified people, and LGBTQ-related topics prior to their enrollment in the program.

The Science Educator Preparation Program

The science educator preparation program (SEPP) is best described as a 5th-year program leading to a master's degree science teacher initial license program (Arends, Winitzky, & Murray, 1996). After the completion of the initial licensing year, the TCs had the option to receive a master's degree in curriculum and instruction by completing an additional four courses beyond those required to be recommended for licensure. The three main components of the SEPP were the common content courses, science methods courses, and field placements. The science methods courses included a summer course emphasizing inquiry-based science instructional practices, a fall middle-school methods course, and a spring high-school methods course. The common content courses began in the summer and continued throughout the licensing year including: the historical, anthropological, and sociological foundations of education (HASE); learning technology, education psychology, reading in the content areas, and the fundamentals of drug and alcohol addiction. The SEPP emphasized providing the TCs with a prolonged engagement in public school classrooms. These field placement experiences included a 12-week placement in a middle school in the mornings during the fall semester and a 12-week placement in a high school during the spring semester concurrent with the science methods courses. The candidates spent over 500 hours planning, supporting, and/or leading secondary science classes.

LGBTQ-Inclusive Major Teaching and Learning Events

LGBTQ people and topics were woven throughout the coursework in the EPP in the common content courses, the science methods courses, and, in some cases, in the field

placements. Included among these opportunities for TCs in the SEPP were three prolonged and focused LGBTQ-inclusive lessons. I refer to these as the major teaching and learning events (MTLEs). Opportunities for dialogic conversations were built into all of the MTLEs.

MTLE-I. I co-planned MTLE-I, which occurred during the fall in the HASE course, with several instructors of the course. This lesson built a general foundation for understanding gender and sexual diversity in education in regards to the need for LGBTQ inclusion in secondary teaching. The lesson was planned for a broad audience of secondary TCs pursuing their initial licenses. This MTLE included much of the research included in the background of this study. It emphasized outcomes for LGBT and questioning students, a clip from the film *Bullied*, a news article about the tragic outcomes of bullying in a nearby large school district, and suggestions from research about school and classroom factors that correlate to better outcomes for LGBT and questioning students. The instructors of the course and TCs in the course shared their own stories and experiences about gender and sexual diversity during their schooling experiences. The TCs were assigned a teacher identity self-study (TISS) in connection with this lesson (see Appendix E, TISS-B, discussed in more detail in the assignments section).

MTLE-II. I planned the second MTLE with input from the secondary science methods instructor. It occurred during the winter. This lesson provided an opportunity for the science TCs to connect what they had learned during MTLE-I to their developing praxis as science teachers. MTLE-II focused on recognizing and challenging

heteronormativity in science teaching and learning. Prior to MTLE-I the TCs were assigned a reflective journal (RJ, see Appendix F, RJ-F, discussed in more detail in the assignments section).

MTLE-III. MTLE-III occurred early in the spring semester, shortly after the TCs had begun their high school student placements. The third MTLE was planned using feedback about MTLE-II from the TCs. The TCs were assigned a reflective journal prior to MTLE-III (see Appendix F, RJ-W, discussed in the assignments section.) The purpose of this lesson was to provide an opportunity for deeper dialogic conversation, metacognition, and reflexivity around creating LGBTQ-inclusive science learning environments.

Data Collection

Following the bounds of the case, the data for the study was collected over a 21-month time span from when the TCs entered the SEPP and as they neared the completion of their first academic year after receiving their teaching licenses. Data collection focused on the 12-month span of the SEPP during which data collection was highly coordinated around the structure of the SEPP described earlier. After the TCs completed their licenses, data collection opportunities were less formalized primarily due to my reduced access to the participants. Qualitative data was included from interviews, course assignments, communications with me as the researcher, and observations of the TCs during their field placement experiences. See Figure 4.1 for a visual representation of the fit between the SEPP, major teaching and learning events, data collection points, and the post-SEPP time period.

Interviews. Interviews with the TCs were the primary source of data collection in this study. Responsive interviewing techniques were followed. Responsive interviewing emphasizes flexibility and adaptability such that interviews feel more natural (Rubin & Rubin, 2012). This approach to interviewing was selected because it develops trust and openness between the interviewer and the participant. Interviews were conducted at three pre-determined "key" moments in the SEPP: an initial study orientation and baseline interview; after the explicitly LGBTQ-inclusive learning experiences in common content courses and science methods courses; and at the completion of the SEPP. The questions guiding the interviews are included in Appendix D.

Assignments. The mandatory assignments from the SEPP that prompted the participants to reflect on their own identities in regards to teaching diverse learners and those that emphasized gender and sexual diversity were included as data in this study. These included the teacher identity self-study (TISS) assignments and reflective journal (RJ) assignments described below.

The teacher identity self-study assignments. The TISS were embedded in the common content course about the history and anthropology of education to prompt TCs' self-reflection about their own cultural and educational experiences. The TISS were developed in line with identity theories of teacher education as a means to promote the development of equity-oriented teaching practices (see Hollins, 2011). The full

assignments are included in Appendix E. TISS-A[6] occurred during the summer and focused on the cultural and academic autobiographies of the TCs. TISS-A included a prompt for the TCs to outline an early draft of their own personal philosophy of education. TISS-B occurred during the fall after MTLE-I and focused on the experiences of the TCs around gender and sexual diversity in education. The prompt asked the TCs to connect those experiences to their future teaching. TISS-C, a final reflection about the TCs' learning during the course, occurred in the spring. TISS-C required TCs to write a letter to themselves that they would receive during the spring of their first year teaching. TISS-C did not emphasize gender and sexual diversity. Although not designed with STC in mind, these assignments prompted TCs to be metacognitive and reflexive as they developed their praxis.

The reflective journal assignments. Reflective journaling occurred throughout the science methods courses. The RJs were posted by the TCs to an on-line forum with prompts. Often the TCs were asked to respond to the RJs of their peers. Although there were more than 20 total RJs, two RJs were analyzed for this study. RJ-F occurred prior to MTLE-II. The prompt for RJ-F was to analyze science texts the TCs were using or might use in their secondary science classrooms in relation to heteronormativity. RJ-W occurred prior to MTLE-III. The prompt for this assignment asked TCs to reflect about their experiences creating LGBTQ-inclusive secondary science classroom curriculum.

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[6] TISS-A was the combination of three TISS prompts that the participants completed during the summer. These were combined due to the overlapping topics and the nature of the participants' responses to the prompts.

	Year 1				Year 2			
Season	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring
Initial License Program	Common Content & Methods Courses				Post-SEPP			
Major Teaching and Learning Events		MTLE-I	MTLE-II	MTLE-III				
Field Placement		Middle School	High School			First Year Teaching*		
Data Collection Points	IV-1 TISS-A	TISS-B RJ-F	IV-2 RJ-W	TISS-C	IV-3	Informal Check-ins		

Figure 4.1. Alignments between Programmatic Structures and Data Collection Points. SEPP = science educator preparation program. MTLE = major teaching and learning event. FP = field placement. DCP = data collection point. IV = interviews. TISS = teacher identity self-study assignments. RJ = reflective journal assignments. Informal check-ins included email, phone calls, and in-person visits. The study spanned most of a two-year period including Year 1, the SEPP, and Year 2, the first year teaching. *Sara, Mike, and Robyn taught during Year 2, Leo did not accept a teaching position during Year 2 (post-SEPP).

Data Analysis

Phases of the analysis. The analysis of the study was written in three phases. The determination of the phases was based on Yin's (2009) emphasis that the case study emphasize "the most significant aspect of [the] case study" (p. 161). The STC framework suggested the following structure for the analysis: the first phase introduces the four participants' cases by focusing on the identities of the participants and their initial commitments to LGBTQ-inclusive praxis; the second phase describes critical incidents when the participants' commitments to and/or enactments of LGBTQ-inclusive praxis seemed to crystalize. In line with STC, the analysis of these incidents is framed within the context in which the incidents occurred. Critical incidents, "place emphasis on the role of particular occasions in shaping the way people understand their world, rather than treating the learning process as a steady accumulation of knowledge at an even pace" (Denscombe, 1999/2007, p. 204). The final phase provided a description of the participants' commitments to and/or enactments of LGBTQ-inclusive praxis at the end of the study, sometime during each participant's year after they had completed the SEPP. Each phase included a cross-case synthesis to examine patterns and complexities within and across the cases.

Levels of commitment to LGBTQ-inclusive praxis. Analysis of the evidence of commitment to LGBTQ-inclusive praxis in the cases prompted the development of the "Levels of Commitment to LGBTQ-inclusive Praxis" depicted in Table 4.2. This analytical framework contributed to understanding the complexity of the participants' experiences with the phenomena.

Table 4.2

Levels of Commitment to LGBTQ-inclusive Praxis

Level	Description
LGBTQ naïve	Makes no commitment to supporting LGBTQ-identified students
	Minimizes occurrence of or victimization of LGBTQ-identified people
LGBTQ aware	Makes a commitment to supporting LGBTQ-identified students that demonstrates the realization of problematic school experiences for students
	Cannot readily describe ways to enact supports for LGBTQ-identified students in teaching and learning environments
LGBTQ supportive	Makes a strong commitment to LGBTQ-identified students based on the desire to improve students health and learning outcomes
	Commitment to enactment of supports for LGBTQ-identified students focuses on creating safe learning environments through statements about the classroom being safe and/or planning for the direct management of student behavior that is biased towards LGBTQ-identified people
LGBTQ dedicated	Makes a strong commitment to LGBTQ-identified students based on the desire to improve students health and learning outcomes
	Commitment to enactment of supports for LGBTQ-identified students includes creating safe learning environments through statements about the classroom being safe and/or planning for the direct management of student behavior that is biased towards LGBTQ-identified people
	Commitment to enactment includes plans for LGBTQ-inclusive curriculum

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer.

The four levels of commitment to LGBTQ-inclusive praxis developed were LGBTQ naïve, LGBTQ-aware, LGBTQ-supportive, and LGBTQ-dedicated. These levels emphasize the characteristics of classroom environments which have been shown to correlate to better outcomes for LGBT-identified students: supportive educators, safe and welcoming classrooms, and LGBT-inclusive curriculum (Kosciw, *et al.*, 2012).

Time-series analysis. Time-series analysis was utilized in this study. Yin (2009) indicated that "the ability to trace changes over time is a major strength of case studies" (p. 145). A time-series was a natural fit for the complex data structure utilized in the study as each major data collection point (seen in the bottom of Figure 4.1) provided a snapshot, albeit incomplete, of the participants' commitments to LGBTQ-inclusive praxis over time. The time-series in this study was presumed from the inception of this study to be complex. The time-series analysis was not intended to add to a developmental model of LGBTQ-inclusive praxis, rather it was to deepen the understanding of the complexity of the phenomena.

Evidence of commitment and enactment of LGBTQ-inclusive praxis. Evidence of the participants' commitments to and enactments of LGBTQ-inclusive praxis emerged throughout the bounded timeframe of the study. These were reported to me during the interviews, in informal email communications, in curriculum materials they developed, and in the assignments they completed. Direct observation of the enactment of LGBTQ-inclusive praxis was unlikely because I was not the supervisor for all of the participants during all of their field placement experiences. On rare occasions I was able

to directly collect data regarding participants' enactment of LGBTQ-inclusive praxis during a routine, required classroom visit during their field placement experiences.

Themes. As discussed in the theoretical framework for this study, my analysis was framed around STC. STC prompted my attention to the consideration of the participants' identities, the contexts of their teaching and learning, and the systems of power in which they were developing their praxis. STC focused my analysis to these elements of the cases seeking to describe how identity, context, and power contributed to the participants' development of commitments to and enactments of LGBTQ-inclusive praxis.

Member Checking by Participants

Preliminary analysis of the TCs' assignments and first two interviews was complete prior to the final interview. This permitted a lengthy member checking conversation during IV-3. The member-checking portion of IV-3 focused on the participant TCs' comfort with the level of detail shared in their case and the validity of my analysis of their case up to that point. My analysis and presentation of the cases and analysis was adjusted based on their feedback. The primary addition to my analysis was the belief which was voiced by three of the participants-- which I had not previously noted-- that participation in this study and the additional time they had to reflect during the interviews supported their development of LGBTQ-inclusive praxis. The participants did not have an opportunity to formally member-check my understanding of any new narratives they presented during IV-3.

Limitations

The holistic multiple-case study design used here is not intended to lead to generalizable conclusions. This largely descriptive study is intended to prompt deeper understanding of the possibilities for developing science TCs' commitments to and enactments of LGBTQ-inclusive praxis. The discussion includes a more detailed discussion of the implications and limitations of this study.

Cases and Analysis

Phase 1 -- The Science Teacher Candidates

STC emphasizes the role that learners' own identities play in transformation in teaching and learning. STC argues that learning to teach for social justice requires knowing oneself. Thus, Phase 1 of the study focused on the initial identities of the participants in order to understand their position in regards to teaching diverse students. The analysis in this phase also explored the participants' commitments to LGBTQ-inclusive praxis prior to the MTLEs. Like all of the other TCs in the SEPP, the participants in this study had been asked to examine their own identities in the TISS-A assignment. The TISS-A assignment and baseline interview were used to describe the identities of the four participants and their relation to LGBTQ people and topics as they were beginning their enrollment in the SEPP. The data here was gathered during the summer of Year 1.

Sara. Sara was the first person to volunteer for the study. She responded almost immediately. Sara identified as a white, middle to upper class women who grew up loving school. She had attended schools in the city and inner-ring suburbs. Sara had been

enrolled in a graduate program in nutrition and food science prior to her enrollment in the SEPP. She had decided that she wanted to teach. She had spent some time as a coordinator for a tutoring program that served students who were not meeting proficiency levels under No Child Left Behind. Sara was seeking licensure in high school life science.

Sara had a somewhat quiet and reserved demeanor. She also wrote exquisitely and compellingly, a characteristic which equipped her to be a very good "student" in the SEPP as the program demanded a substantially large amount of reflective writing. In TISS-A, she wrote:

> While in some ways I was a "model student," in high school, there were also things that I found difficult. Discussions or assignments that required me to form and defend an opinion were (and still are) challenging for me, especially when I had to do so quickly or with limited information. Taking risks, be it raising my hand in class or writing a controversial thesis statement, could be nerve-wracking, and it wasn't until junior year in high school that I had an English teacher who really pushed me to do so.

Initially, Sara's passion for learning and school left her in dismay that "not everyone is as interested in academic pursuits" (IV-1).

In the first interview, Sara commented that there was now much greater diversity in the high school she had attended. She noted that the "demographics have changed a lot" citing that she had seen just "one white face in the class" she had observed (IV-1). She did not specifically address any non-white identities as she spoke about diversity

broadly. She did consider student diversity in terms of abilities and values of education and class.

Sara believed that difference ought to be celebrated and enjoyed in school environments:

> It is enriching to recognize other points of view, and exposure to different ways of thinking helps one to understand and question his or her own values. I want to create a safe classroom culture, where students are able to ask questions without fear, and that values the experiences and contributions of the whole class. I will provide opportunities to work in groups and learn from peers, and I will recognize that science is but one way of knowing the world and the self. I believe that learners are more open to exploration and inquiry when they feel safe to take risks without judgment. (TISS-A)

Sara recognized that while she had outside perspectives on other cultures, she did not *know* about other cultures deeply:

> Aside from the window into another culture that visits to my dad's hometown afford me, I mostly experience other cultural groups as a spectator. I watch the ladies in outrageous hats walk to the Baptist church at the end of the block, eat papaya salad at the Hmong Marketplace, and obey the suspension of traffic rules at [local intersection]. I consider myself lucky to live in a place with so many cultures, but rarely interact with people outside my own culture beyond a short conversation at a coffee shop about food or the weather. I am also lucky to have

> visited Sweden and India and studied in Spain and Peru, and benefited from considering American culture from an outside perspective. (TISS-A)

As she wrestled with her growing awareness that not all learners received the same treatment in education, her deeply held commitment to diverse learners resulted in her feeling dismay that different students were not expected to do the same level of work as other students. She exclaimed, pleading as she sought to make sense of it, "how does this happen?" (IV-1).

Although analysis of IV-1 and TISS-A suggested that Sara lacked awareness about the needs of LGBTQ-identified learners. She had a naïve commitment to LGBTQ-inclusive praxis, Sara was sponge-like in her yearning to learn how to teach and attend to diversity. I saw in her a great potential for committing to and enacting LGBTQ-inclusive praxis.

Leo. Leo identified himself as a white, Christian male who had grown up in a middle-class family in a relatively small town. He was an athlete and was seeking licenses in high school chemistry and life science. Leo had been enrolled in the "pre-teaching" program at the institution prior to his enrollment in the SEPP. In TISS-A, Leo shared: "being a homosexual male, I have been subjected to name calling, bullying, problems identifying with friends, and much more. These are some of my own individual struggles that have made me a stronger, more resilient person." Leo was the first TC I had ever worked with whom had directly declared a non-straight or non-cisgender identity. Although he had not volunteered to participate in the study, I asked him directly to participate. Leo agreed with neither reservation nor enthusiasm.

In TISS-A, Leo spoke about his perspectives about diversity:

> through my own personal struggles, as well as the way I was raised in an accepting, open-minded family, I have learned to respect and value diversity. This acceptance has only been strengthened by a variety of experiences I've had with diverse groups of people.

Leo said:

> through self-discovery and dealing with everything being thrown at me, I learned to have a strong kindness and empathy toward others. I can happily say I have a strong sense of my own personal identity, and can absolutely commiserate with anyone struggling with his or her own.

He continued:

> I will try my best to avoid being color blind, and make sure to learn about every student's background so I can better understand where they come from and how they will best learn. I will allow options for all projects so that students can choose the way they want to learn. No matter whether they enjoy making rap videos, documentaries, poems, powerpoints, or writing essays, students should be able to use what they enjoy and what they're good at to help them better grasp the material.

For Leo, understanding a student's "background" was viewed as integral to creating meaningful learning opportunities for his students. This was complicated, though, by his own personal decision to keep his sexual orientation distinct from his own life as a

student in the SEPP. I was the only person in the SEPP which Leo ever talked directly with about his sexual orientation.

Analysis of IV-1 and TISS-A suggested that Leo entered the SEPP naïve in terms of his commitment to LGBTQ-inclusive praxis. This was a difficult level to assign. Certainly, Leo had the experience that being "homosexual" had been linked to negative experiences during his schooling. However, he did not generalize to the idea that gender and sexual diversity more broadly might be linked to negative experiences in schooling. Though he indicated it was important for teachers to attend to student diversity, he did not make any commitments to support LGBTQ-identified students' experiences in schools. Leo's awareness of the importance of attending to diversity in teaching generally and his personal experience with bullying due to his sexual orientation suggested that he would be likely to commit to and enact LGBTQ-inclusive praxis.

Robyn. Robyn was the oldest of the participants in the study. She had been a full-time mom prior to enrolling in the SEPP. She was active in the parent-teacher organization of the urban elementary school her children attended near her house. She had studied environmental science and was pursuing her license in middle school science and life sciences.

Robyn was very conscientious about her plans to be a teacher; she knew very well that it would be an intense journey, for as she explained, she had several family members who were educators. She had tested her own commitment to teaching as a substitute teacher. In preparation for the SEPP, she had backed out of her numerous community obligations and made it clear to her family that she would be working very intensely in

the coming years as she completed the SEPP and entered the teaching profession. Robyn described her own schooling experience saying:

> I was a compliant student, an eager learner, and was only satisfied with top marks. I come from a family of educators and my values about education seemed to be transmitted to me at birth. Learning was highly valued as a lifelong process. (TISS-A)

Robyn was perceptive and reflective from very early on about how race affected people's experiences in the world. She described how some of her friends in high school had experienced harassment during the first Gulf War because, though they were Indian, members of the community perceived that they were Arab:

> This touched me intensely and woke me up to the fact that even though I didn't "see" them as any different, they were experiencing a much different life in our town than I was. I wasn't completely immune, however. My boyfriend, a Chinese American, and I were often harassed by police officers when we were together. On two occasions we were interrogated and my boyfriend was treated roughly when they assumed that I was not with him voluntarily. More than once we were pulled over in his family's car and asked who owned the vehicle. It is depressing but interesting that my family owned the same model car and neither my brother nor I were ever pulled over and questioned about stealing our family's car. (TISS-A)

This awareness, as Robyn described it, of the effect of difference on one's life experiences pre-dated her enrollment in the SEPP. Her awareness extended beyond race

and ethnicity. When Robyn described her future students she articulated numerous aspects of student diversity including differences in economic class, motivation to attend school, experiences with abuse, mobility between schools, involvement of parents, and ranges of prior experiences with school (IV-1).

Although she indicated that she was aware of the impact of difference on life experiences, during IV-1, just a few weeks after Robyn had entered the SEPP, she remarked, "the way I am in the world has changed." She had found the readings assigned in the common content course to be awakening as she had come to even greater realizations regarding the privileges she had experienced in her life. In her words:

> I can see now what I did not see as a child; that my childhood was one of privilege in almost every respect. As a white, middle-class child in a Christian home with two parents and no one with disabilities, I had the unearned advantage that I looked like and lived like the majority groups in our society. I can now see the privilege of unintentionally sharing these characteristics and how it helped to shape my growth. I did not suffer from personal racial prejudice, I always had access to resources, my religious background was not questioned or misunderstood or feared, I had role models of both genders who were available and my family did not have hardships due to physical access or discrimination related to any disabilities. The only characteristic that I paid attention to as a young person, however, was my gender. This makes perfect sense when I realize that none of my other traits hindered my ability to safely and happily find my way

> in life; they mostly affected me in positive ways. The only thing that affected me negatively is being a female. (TISS-A)

Robyn continued to elaborate on the intensity with which she had felt injustice as a student due to her gender:

> From my first days in school I resented the different options that I felt boys were automatically afforded. I am famous in my family for my fight with my kindergarten teacher who insisted that only girls wear nurse's hats while boys got to wear doctor's hats on a hospital field trip. There was considerable peer pressure in late elementary school and through middle school to not be too smart as a girl. (TISS-A)

In TISS-A and in IV-1, Robyn indicated that she had "many homosexual friends, classmates and colleagues" (TISS-A).

Analysis of Robyn's IV-1 and TISS-A suggested that she entered the program naïve in terms of her commitments to LGBTQ-inclusive praxis. She demonstrated awareness of LGBTQ-identified people, but did not indicate awareness of the negative experiences many LGBTQ-identified students experience in schools. Robyn's sensitivity to diversity in schools, her capacity to be metacognitive about her learning regarding teaching, and her experience with inequity about her gender suggested that she would likely adopt commitments to and enactments of LGBTQ-inclusive praxis.

Mike. Mike was the last participant that enrolled in the study. I had gone to my colleagues looking for a TC who might be more resistant in regards to the need to attend to student diversity in general and/or gender and sexual diversity in particular. A

colleague suggested that I approach Mike. Uniquely, though, Mike was not just a typical white, middle-class man from the suburbs. His family was blended by marriage and race. He had grown up a white person with numerous African American family members (TISS-A). Mike was seeking licensure in high school chemistry.

Mike had finished one year of medical school before deciding that it was not for him. He yearned for something more dynamic and meaningful (IV-1). Mike was excited about teaching science because, "there's the chance that I could trigger that [love of chemistry] in students, get them excited about being [scientists] or doing science" (IV-1). He believed in science with a tone of religiosity. He was in awe of "the power of science to answer questions about the natural world" (IV-1). Complexly, though, he regarded science as a fallible human endeavor. He enjoyed the philosophy of science course he was taking in conjunction with meeting the requirements of the SEPP.

He stated that the HASE course was "not helpful […] I don't feel I'm getting out as much as I'm putting in. I'm confused about how the way you look at cultural [*sic*] will change how you will teach" (IV-1). Indeed, Mike already had a complex awareness of diversity in urban environments noting that there was both extreme wealth and extreme poverty. He was cautious about making overly simplistic categorizations about "urban" vs. "suburban" environments saying, "it's not easy to pinhole inner city or suburban." In his discussion about diversity in classrooms during IV-1 he indicated race, class, gender, and sexual differences as being important. Mike said, "I need to be aware of how I differentiate my instruction, in most cases, so that I can try not to" (IV-1). He continued "I need to differentiate around special education needs in education and disabilities. I

would need to differentiate because of the need there." In this way, Mike seemed to minimize cultural differences between people as having relevancy to his pedagogy while he emphasized differences that had a more medical or biological basis.

Based on analysis of IV-1 and TISS-A, Mike had a naïve commitment to LGBTQ-inclusive praxis. He knew that there would be sexual diversity in his classrooms, what he referred to as "sexual differences," but he did not demonstrate an awareness of the needs of LGBTQ-identified students. He explicitly dismissed such a need. Mike seemed unlikely to adopt commitments to and enactments of LGBTQ-inclusive praxis.

Phase I – Synthesis across the Cases

The participants in this study demonstrated a range of awareness about the role of privilege due to race, ethnicity, religion, class, ability, gender, family structure, and sexual orientation and how those shaped life and school experiences. Sara and Mike were the least familiar with examining the role of marginalized identities on people's experiences in the world. Sara was open to learning about how she ought to learn to attend to those differences in the classroom though Mike actively denied that most of those identities ought to be attended to by teachers in classrooms. Robyn and Leo entered the SEPP with a greater awareness of how marginalized identities shaped people's experiences in the world. Although Robyn did not suggest that teachers needed to attend to those differences, Leo, the participant with the greatest prior experience with formal education about teaching did perceive that teachers needed to attend to those differences. It is noteworthy that the one experience these two participants shared in common was prior experience with intense injustice they perceived as being based on their own

identities or associations; for Leo that had been around his sexual orientation and for Robyn that had been around her gender and her Asian boyfriend.

Mike, Robyn, and, Leo mentioned diversity of sexual orientation in some manner in IV-1 and/or TISS-A. For Leo, that diversity was his own identity as a "homosexual male." For Robyn, that diversity included "homosexual" people she knew personally. Although Mike did not indicate that he had any personal relationship to anyone who had an LGBTQ-identity, he was the only participant who explicitly stated that there would be "sexual difference" in his future classrooms. Though sexual diversity had been mentioned, it was noteworthy that none of the participants mentioned any transgender related identities. Robyn had attended to differences along the traditional male vs. female binary in regards to how gender influences students' experiences in school.

All of the participants demonstrated a naïve level of commitment to LGBTQ-inclusive praxis prior to the MTLEs.

Phase 2 – Commitments and Enactments during the SEPP

Phase 2 describes critical incidents related to the participants' commitments to and/or enactments of LGBTQ-inclusive praxis. In line with STC framework, the analysis of these incidents that follows emphasizes the contexts in which the critical incidents emerged. This phase of the analysis also includes the time series analysis. The complete time-series about the teacher candidates' commitments to LGBTQ-inclusive praxis that was observed in the data is presented in Table 4.3.

Table 4.3

Teacher Candidates' Commitments to LGBTQ-Inclusive Praxis

Teacher Candidate	IV-1	TISS-A	TISS-B	RJ-F	IV-2	RJ-W	TISS-C	IV-3
Sara	N	N	S	A	D	A	S	D
Leo	N	A	D	A	D	A	S	D
Robyn	N	N	D	D	D	D	D	D
Mike	N	N	N	A	A	N	*	D

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer. IV = interview. TISS = teacher identity self-study assignment. RJ = reflective journal assignment. N = naïve. A = aware. S = supportive. D = dedicated. *This document was not available for analysis.

Sara. Sara's commitment to LGBTQ-inclusion fluctuated up and down as observed in the data through the length of the study (see Table 4.3). In TISS-B, after MTLE-I, Sara's commitments to LGBTQ-inclusive praxis reached the supportive level demonstrated as she articulated how she might handle a likely scenario in her classroom:

> I would argue that we must also raise the consciousness of students to inequities based on gender and sexual diversity. In my classroom, this philosophy will take several forms. First, I will work to make my classroom a safe space by not tolerating any language or actions that might hurt others. I will be explicit about what language I consider offensive. For younger students who may not understand the impact of what they're saying, I really liked [instructors'] tactic of clearly stating why a comment doesn't make sense ("no, homework doesn't have a sexual orientation") and asking students to "choose another word" ([instructor], 2012). This allows students to express themselves in appropriate words that more accurately convey their feelings. Second, I will weave issues of gender inequality into my science curriculum. Fewer women than men have jobs in science. I want all students, boys and girls, to think of themselves as scientists. (TISS-B)

Between the lines, Sara's choice to focus on binary differences between male and female in an assignment focused on greater gender and sexual diversity suggests some possible discomfort about directly addressing LGBTQ-related topics. Sara expressed this discomfort explicitly in IV-2: "I would like students to know that I am someone who's safe to talk to if they would like to, but it would feel weird to make a blanket statement to that effect." This discomfort suggests the emotional impact Sara's metacognitive effort

was having for her. That feeling of "weird" suggested Sara's changing sense of what a science teacher ought to do in their classroom after MTLE-I.

Sara experienced an LGBTQ-tolerant context during her fall field placement. Her cooperating teacher had a "Safe Space Sign[7]" posted on her wall and a drinking container with a rainbow on it. Her cooperating teacher (CT) modeled addressing LGBTQ-bias in the classroom though the CT did not enact LGBTQ-inclusive curriculum. In contrast, Sara experienced an LGBTQ-invisible context during her high school field placement. She remarked that she was surprised that there were no "Safe Space Signs" (RJ-W). Her "surprise" suggested that a major shift had already occurred for Sara. Sara's sense of normal and strange had already been destabilized. What had been "weird" was now "normal."

Sara heard no mention of a gay-straight or gender and sexuality alliance (GSA) during her high school field placement. Sara also remarked that she had seen no signs of LGBTQ-bias, bullying or, for that matter, any evidence of gender and sexual diversity at all. However, another TC placed in the same school mentioned early in their placement there that they had heard LGBTQ-biased remarks including "that's gay" (field notes). During a routine observation of Sara's teaching, my second time in her classroom, I overheard a conversation between a group of three students, two appeared to be female

[7] "Safe Space Signs" are often used by teachers to indicate that they are an ally for LGBTQ-identified people. There is some research that suggests that the presence of these signs alone correlate to better outcomes for LGBT youth in school settings (GLSEN, 2012).

and white (FWS). The third was ambiguous in terms of their gender. I could not hear everything they were saying but my notes read:

FWS1. … that's my girlfriend now

FWS2. yeah, now she's my lesbian…

FWS2. she saw me ask…

I note now that one student in this group has a [clothing description] and is not strongly masculine/feminine

This observation directly contradicted Sara's assertion that there was no gender and/or sexual diversity in the school. Sara and I engaged in a dialogic conversation about this incident. My observation had surprised her. She seemed disappointed in herself though I reassured her that she had done nothing "wrong." She certainly had not *intended* to miss noticing this aspect of her students' identities nor had she been in any way acting biased towards them. Sara just was not noticing it. This fits with our understanding about novice teachers, that "they are sometimes so consumed by looking like teachers that they miss understanding the complexities of student behaviors" (Berson & Breault, 2000).

Although Sara had committed to LGBTQ-supportive praxis in TISS-B she had found it challenging to enact LGBTQ-inclusive curriculum in the units she was responsible for during her field placement. She was assigned to teach photosynthesis and cellular respiration, which she did not feel lent themselves well to addressing gender and sexual diversity. I had not been able to contribute ideas other than challenging the notion that mitochondria were "maternal" (see Spanier, 1995) which, even to me, felt like potentially more of a diversion than a solid LGBTQ-inclusive opportunity.

Ultimately, and in part seeming to respond to my observation of the gender and sexual diversity in her classroom, Sara created an opportunity for enacting LGBTQ-inclusive praxis in her ecology unit. The following notes are from the regular field observation in which Sara and her partner teacher (PT) were discussing differences in hand sizes between males and females. The passage includes Sara, her PT, a presumed male white student (MWS), and a presumed female white student (FWS):

Sara. When we say normal we don't mean normal is a good thing or that this is what is normal… there are a lot of things that follow this pattern, we call that the normal curve. Now, this is from just a certain population. Do you think this would follow the pattern for all the humans on the Earth?

MWS. No, we don't know about everyone on the planet.

... [additional comments from students]

PT. There are also people who wouldn't describe themselves as male or female, so they might not show up on here.

MWS. That's weird.

PT responds to student comment about that being weird, inaudible but student nods

FWS. Oh, that's sad. They don't feel they belong.

In this brief interaction Sara and her PT were able to create a moment of openness that appeared to provide students a moment to question traditional assumptions about sex. As an observer, I found it noteworthy how rapidly the students listened, commented, and

resumed classroom business as usual. This very brief moment demonstrated Sara's capacity to enact LGBTQ curricular inclusion.

The time series analysis of Sara's commitments to LGBTQ-inclusive praxis was complex. Sara's commitments vacillated. Table 4.3 does not capture the complexity of Sara's experience. It was clear that she was tentative and somewhat reluctant about LGBTQ-inclusive praxis early in the SEPP. Sara seemed torn between her desire to be an ideal teacher just as she had desired to be an ideal student and her lack of examples to guide her inclusive praxis. Sara expressed a strong desire for more resources. She thought videos of exemplary LGBTQ-curricular inclusion in science would be a big help to her. She also wanted specific ideas for inclusion that were tied to the State Science Standards.

Leo. Leo's teaching context was LGBTQ-invisible. There was no GSA in his building. He thought he had seen a sign for a meeting once, but when he had gone back to look at the sign a few days later he found that it had been removed. He heard what he referred to as "anti-gay" slurs in the hallways.

In IV-2, it was clear that Leo's ideas about curricular inclusion were very different when he spoke about LGBTQ inclusion as a chemistry teacher vs. as a biology teacher. As a chemistry teacher, he focused on LGBTQ inclusion in terms of classroom leadership. He expressed how he hoped to one day share about his own experiences with gender-based bullying as a child with his students. As a biology teacher, though, he made numerous commitments that were specific to curricular inclusion. He felt like the genetics unit would be a good site for LGBTQ curriculum inclusion:

> I also think it is important to include gender and sexual orientation into curriculum. I think genetics is one way to do this. Students may be able to research the genes/environment debate about homosexuality and understand more that way. They may also be able to see examples of animals of the world exhibiting these behaviors. Another way to be inclusive is to talk about different scientists that were male and female, and those that were gay or lesbian, or even transgender or bisexual if you find examples. By being inclusive, students can have boosted self-esteem, and be more intuitive to social issues that they see in the news (Biegel 2010). It is important to include aspects of queer pedagogy to de-marginalize the "norm" of gender as binary and sexuality as a simple gay or straight concept (Meyer 2010) [*sic*]. (TISS-B)

Leo's commitment as demonstrated here exemplified a dedicated level of commitment to LGBTQ-inclusive praxis. Leo very clearly linked students' needs for inclusive curriculum.

Leo's enactments were centered at the classroom leadership level. In IV-2 Leo reported that the first time he had heard an "anti-gay" remark in his classroom it had come from the other side of the room and he consciously decided that he was not going to engage it because he felt it would be too distracting. He felt embarrassed by this. He had been "planning" for that moment and had anticipated that he would immediately and smoothly intervene. In line with the tenants of the dialogic conversation, he and I had discussed all the complexity in that moment and re-assured him that he had not missed his only moment to enact the response he had been planning.

Leo had another opportunity a few weeks later. He described a situation in which a student remarked about competitive cheer squad being "gay." Leo had responded, "we don't use those words in the classroom. It's not 'gay,' it's not homosexual" (IV-3). Leo elaborated in the interview recalling that he had felt nervous elaborating by adding that he had felt red in the face. He had worried that the student would have a different attitude towards him after he had responded to the biased remark. In contrast, to his surprise, he felt that his relationship with the student had actually improved after his intervention.

The time series analysis of Leo's commitments to LGBTQ-inclusive praxis varied across the data collection points (see Table 4.3). In Leo's case, this may be been because he was not a very reflective writer. A complexity that Leo addressed in IV-2 and IV-3 was based on his own sexual orientation. He thought about negative incidents related to teachers that he had observed including a very explosive situation involving a teacher at the high school he had attended. Though Leo was interested in curricular suggestions about LGBTQ inclusion, his requests at the end of the SEPP were more personal. He wanted support and counseling about, for instance, whether or not to "come out" about his sexual orientation during his interviews (IV-3).

Robyn. The site of Robyn's field placement was the most LGBTQ-inclusive context in this study. She regarded it as near the level of LGBTQ-accepting. There were numerous student-made and professionally-produced posters aimed at raising awareness of LGBTQ-identified people in the hallways. There were "Safe Space Signs" that had been printed *en masse* on which teachers had written their own names taped inside the window by the classroom door of almost every classroom. Robyn explained that most of

the faculty had participated in training about LGBTQ-related topics at the beginning of the school year. Though, she indicated with some remorse, her own classroom did not have a sign hanging in the window in the hall because her classroom teacher had been on sabbatical during the first semester of the school year. She said that she was going to find who had made them and ask for one, but she was not able to act on that commitment.

Robyn adopted and maintained a dedicated level of commitment to LGBTQ-inclusive praxis during her placement. In TISS-B after MTLE-I Robyn explained her strong position:

> My philosophy as a teacher has definitely changed lately and I have realized that I can't just tell myself that I am an open and tolerant and accepting person when teaching young people. I need to be clear, deliberate and outspoken about being an ally, supporter and protector of all of my students. The research is clear and unambiguous: students are being harassed and assaulted based on their sexual orientation and this has cumulative negative effects on their performance and outcomes in school (GLSEN, survey). Not only is it better for all of my students to see that I respect them all, but it is required by our […] State Statutes that all students have the right to fair and appropriate education and freedom from discrimination ([State Law]). As Meyer (2010) explains, there are four areas that we need to think about if we want to create a positive learning environment for all of our students: student safety, their physical and emotional health, diversity and equity, and student engagement and success. When students are discriminated against or harassed, they cannot achieve in all four areas, and that should be the

> concern of all teachers. Every student will do better when they realize that all students' individual differences are celebrated, not ignored or discredited. (TISS-B)

She went on in the assignment to describe numerous possible ways she could be LGBTQ-inclusive within her classroom leadership and curriculum. It is possible that Robyn's very deep sense for recognizing and responding to injustice, which she identified with from her earliest experiences in education, permitted her to rapidly adopt an intense commitment to supporting LGBTQ-identified youth.

Robyn was able to enact LGBTQ-inclusive praxis in many ways during her field placement. She responded to students' careless use of the term "gay" and she also found ways to directly make space for gender and sexual diversity in her curriculum:

> I was able to provide inclusive instruction for my students who come from many different family structures during our genetics unit. As we created family trees and pedigrees in class I constantly made references to how many families are not structured in these simple ways. I made pedigrees with homosexual couples, multiple matings, and divorce. The students seemed to appreciate the dose of reality and it was very simple to be inclusive in this way while providing the same instruction. (RJ-S)

Robyn also participated in a school-wide event about creating a more accepting learning environment for LGBTQ-identified people. In preparation for commemorating the National Day of Silence, an event originally organized in 1996 by college students to raise awareness about sexual orientation and gender expression, on campus all of the staff

received emails from one of the GSA advisors with information about the event, how the students might be participating, and how the staff could participate. It is common for participants in the event to remain quiet for part or all of the school day, wear dark armbands, and/or wear rainbows on pins or ribbons. Robyn joined-in the commemoration by beginning her class quietly with a sign that she was participating in the event. Robyn reported having several exchanges with students that day who were participating in the event. She remarked how students across racial groups at the school participated suggesting that she had developed sensitivity towards the complex interactions between race and gender and sexual diversity.

Time series analysis of Robyn's commitment to LGBTQ-inclusive praxis suggested no variation across the data collection points (see Table 4.3). Robyn reached a dedicated level of commitment directly following MTLE-I and did not waiver from that.

Mike. Mike wrote in TISS-B after the MTLE-I, "I haven't observed any noticeable instances of sexual orientation diversity in my [middle school] practicum experiences." He focused his writing on "some interesting differences involving gender" (TISS-B). Mike had conducted a quantitative observation of differences in how males and females were participating in the middle school classroom in which he was student teaching. His analysis of his own observations follows:

> What some might find surprising about Figure 1 is the gender disparity that I viewed in the column of 'who speaks up.' In this case, 45 males spoke up in class compared to 3 females. Upon reflecting on this particular difference, I think that allowing students to speak up is promoting a competitive environment where

> students must compete for the teacher's attention by speaking over each other. The unintended consequence is that most males will feel more naturally inclined to speak up, whereas females will not feel as comfortable participating in this competition. As the Leonard Sax article "Why Gender Matters" reports, females are less likely to be responsive when teachers use confrontational approaches in the classroom, compared to males whom [*sic*] are more likely to thrive in stressful situations (Sax 89). In addition to speaking up, and therefore receiving more positive and negative attention from the teacher, I found that this teacher also helped males out far more during lab than females. (TISS-B)

Although Mike's analysis did not address LGBTQ-inclusive praxis suggestive of a naïve level of commitment, Mike demonstrated an awareness about how social expectations around gender were in the classroom that were influencing the learning experiences of the students in the science classroom.

Mike experienced a complicated context during his spring high school placement. There were some "Safe Space Signs" visible in the building, but some had been marked with homophobic slurs in a foreign language. The administration in the building had taken note and directly responded. The school, thus, was LGBTQ-tolerant. Mike's classroom, however, was LGBTQ-hostile. He described this event:

> I heard a comment in my classroom, uhh, there's two students that talk alot, actually, since then they've been put in different spots so they don't have this issue anymore, but they were talking back and forth, like while the teacher was talking, and this was when I was doing observations of my CT and at one point he pulled

> them apart and he was, like, ‘Alright, [J], why don't you come up here and sit up here.’ And, of course, [J] was like, ‘Why? Why?’ And [the teacher] was like, ‘well I don't want you… and [R] to be flirting anymore.’ And I feel like he's using that to his benefit because he's going to get support and make fun of the fact that these guys are flirting together, and you know, like, of course, like, right away, I think where is he going with this. And he's like, 'Yeah, I don't want you flirting together anymore. It's gross.' But, like right away I notice things like that which, the thing is, the way that they responded to it was in his benefit because I think homosexuality within the... hispanic culture is like less acceptable than it is in other cultures so like the sad thing is that he it kind of used some like culturally relevant uhh strategy there, like, 'I don't want you flirting together, it's gross,' but at the same time… I'm sure that at the same time it's very demeaning to anyone in the classroom who happens to be gay. (IV-B)

Mike did not confront his CT’s use of homophobia as a classroom management strategy, “the sad thing about this is, like, I didn't say anything about this, it's my CT and I've only been together with him for like three weeks and I just don't feel like I'm in a position where I can like speak to him about this” (IV-B). The relationship of power in Mike’s classroom prevented him from enacting the LGBTQ-inclusive praxis he was committed to.

The CT made similar remarks on one more occasion during Mike’s time in his classroom. To make the situation more complex, Mike’s CT was a highly regarded teacher in the district. He was frequently called out of the building to work on curriculum

or attend district meetings. Mike felt like his CT was by most standards a good teacher, yet his relationship with him was soured by his recognition of how these remarks might be creating a negative climate in the classroom. Though Mike's commitment to LGBTQ-inclusive praxis had seemed to be increasing, RJ-W suggested that he was disheartened and minimized the importance of LGBTQ inclusion as compared to creating an inclusive learning environment for other aspects of student diversity such as language and socioeconomic conditions, "because of the unique situation I am in right now as a student teacher, the main support I need is that of my cooperating teacher" (RJ-W). Mike was worried that being more proactive about responding to LGBTQ-bias would create conflict with his CT.

Mike's ultimate solution to getting by with his CT seemed to have been to create a list in his own head of how he would do things differently. For instance, in a lesson about steroidal hormones:

> A male student said another male student might have a uterus and he's like, 'you don't have a uterus. I am certain of that.' Uh. [The CT] kind of made an assumption right off the bat, like, 'no, no you don't have a uterus,' and actually he kind of went into testicles, like when he was talking about testicles there was another comment about like, 'females here, you guys[8] don't have testicles.' He was kind of making some big statements about it. But, it was kind of like, kind of

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[8] Note the peculiar juxtaposition that while clarifying what is typical of a female, the CT was reportedly simultaneously referring to females as "guys."

> like in a comedy tone, like, 'trust me, you don't have a uterus. I'd be worried about you if you had a uterus.' Or something along those lines. (IV-2)

Though he did not call it as such, Mike described a very clear example of what transphobia could look like in a science class. Mike had taken his participation in this research study seriously; he commented: "it was one of those times where I'd really wished I had recorded it because it could have been an even better learning experience if I'd had a better memory" (IV-3). Each time an event like this came up in his CTs classrooms he used it as a learning opportunity as he thought through how he might have done things differently. In this situation, he imagined saying, "'you know, [student name], he could actually have a uterus because during development if there isn't enough testosterone then, as you see here, you're going to develop female reproductive organs except that during puberty you're going to develop as a male.' Just go into the actual science. Because, guess what, it actually happens" (IV-3). I asked Mike how he knew so much and he reminded me that he had been in medical school where students study embryological development at this level.

Time series analysis of Mike's commitments to LGBTQ-inclusive praxis indicated fluctuation between naïve and aware as Mike encountered the MTLEs during his SEPP (see Table 4.3). However, Mike had demonstrated a dedicated level of commitment to LGBTQ-inclusive praxis during his final interview. While he had not enacted LGBTQ-inclusive praxis during his field placement, Mike had made numerous commitments to creating a safe and supportive learning environment for LGBTQ-

identified students and several ideas for bringing LGBTQ-related topics directly into his curriculum as a chemistry teacher.

Supports and Barriers in Committing to and Enacting LGBTQ-inclusive Praxis

Analysis of the supports and barriers in committing to and enacting LGBTQ-inclusive praxis during the science SEPP was guided by STC in terms of seeking both personal and contextual features that influence the participants' commitments to and enactments of LGBTQ-inclusive praxis. This analysis was conducted across the cases.

Legitimizing LGBTQ-inclusive praxis. During the analysis in Phase 1, it was evident that Sara, Leo, and Robyn were pushed from naïve commitments to LGBTQ-inclusive praxis to supportive or dedicated levels after MTLE-I. Although they knew about gender and sexual diversity in education, they had not understood it as something that affected student learning. I theorize that LGBTQ inclusion had not had a legitimate place in their prior experiences in science learning environments. These participants' understanding of the importance of LGBTQ-identities in the science classroom seemed to have been prompted by the inclusion of these topics in their SEPP, a fact which suggests the significance of legitimization of LGBTQ-inclusive praxis. Robyn had felt strongly about the importance of this legitimization during the member-checking portion of this study (IV-3).

Mike's case was anomalous within this data set, as his commitment to a high level of LGBTQ-inclusive praxis was not observed until the very end of the SEPP after the three MTLEs and the end of his spring field placement. His case suggests that some TCs may need more than legitimization to commit to and enact LGBTQ-inclusive praxis.

This support was not part of my original analysis. Robyn drew my attention to this element of their experience committing to, and enacting, LGBTQ-inclusive praxis. I then discussed it with the other participants. They all agreed that this had been very important to their capacity to commit to and enact LGBTQ-inclusive praxis.

The context of LGBTQ Inclusion. The context of the schools the participants experienced varied. The context of the program and the schools in which they were practicing could be described in terms of Elia and Eliason's (2010) "Continuum of LGBTQ Inclusion" (see Table 4.1).

The context of the SEPP. The on-campus portions of the science SEPP demonstrated LGBTQ inclusion that ranged from tolerant to integrated based on the . The primary weakness of the larger EPP in which the SEPP was embedded was the lack of explicit policies calling for LGBTQ-inclusive teacher preparation which, in part, contributed to lack of communication with cooperating teachers regarding the expectations for TCs about LGBTQ inclusion. Additionally, the climate was not a safe enough space for Leo, for instance, to feel completely comfortable being "out" about his sexual orientation. Leo was "in the closet" to such a degree that when I asked the other participants if there were any "out" TCs in their science SEPP they told me that there were none. The method's classes in the SEPP integrated LGBTQ topics including responding to family concerns, evaluating classroom curriculum in regards to heteronormativity, and planning for LGBTQ-inclusive science curriculum. The whole SEPP was engaged with understanding why harassment and discrimination against LGBTQ-identified individuals was unacceptable in educational contexts. All of the

candidates agreed that this context, and what they were learning during the MTLEs, had helped them commit to and enact LGBTQ-inclusive praxis.

The context of field placements. The contexts of the field placements in terms of the school and the cooperating teacher were far more complicated. See Table 4.4 for a summary of the contexts which were noted in the Phase 2 case analysis. Sara and Robyn indicated that their middle school field placement sites had "Safe Space Signs." They felt their middle schools were LGBTQ tolerant. Neither Mike nor Leo discussed their middle school context in enough detail to analyze. The context of the high school placements where the participants had spent more time leading instruction was discussed in far more detail by the participants. Robyn was placed in the most LGBTQ-accepting high school I had ever visited. This may have supported her enactment of LGBTQ inclusion. She was able to participate in a school-level event that she might not have otherwise had the time nor resources to plan for within her own classroom. She was encouraged by school communications to support LGBTQ-identified students. Sara, Leo, and Mike had high school field placement sites that, perhaps, were more typical though no prior research has attempted such an analysis. In their sites, silence and invisibility created a quietly heterosexist tone. Certainly, these contextual features affected the TCs emotionally and intellectually as they navigated enacting their own LGBTQ-inclusive praxis. All of the TCs indicated that this context had mattered to them and agreed with its importance during the member-checking phase.

Table 4.4

LGBTQ Inclusion in Field Placements

Participant	Middle School	Cooperating Teacher	High School	Cooperating Teacher
Sara	LGBTQ Accepting	Posted "Safe Space Sign" in classroom	LGBTQ invisible	Open to learning about LGBTQ inclusion
Leo	LGBTQ Invisible	*No data*	LGBTQ invisible	Open to learning about LGBTQ inclusion; supportive of Leo
Robyn	LGBTQ Invisible	Posted "Safe Space Sign" in classroom; spoke to students about LGBTQ-related topics	LGBTQ accepting	Open to learning about LGBTQ inclusion
Mike	LGBTQ Invisible	*No data*	LGBTQ tolerant	Hostile towards LGBTQ-related people and topics

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer.

A generally open cooperating teacher. Sara, Robyn, and Leo had cooperating teachers who were open to LGBTQ-inclusive praxis. These participants did not focus on their cooperating teachers during their course assignments or interviews. Viewing this "unremarkable" quality only becomes interpretable as a support for the TCs in contrast to Mike's CT. Mike's CT's apparent hostility towards LGBTQ-people and topics inhibited Mike from enacting LGBTQ-inclusive praxis during his spring field placement. However, to complicate the view of supports and barriers, Mike's observation of LGBTQ-hostility in the chemistry teaching and learning context may have provided him with the opportunity he needed to realize the importance of LGBTQ-inclusive praxis in the physical sciences.

Knowledge about the natural diversity of sex, gender, and sexual orientation. Mike's knowledge about the development of sexual organs and his detailed knowledge of the hormonal processes were, from my experience, higher than typical for a science TC. He had a rather unique experience due to his prior enrollment in medical school. The other participants were learning this as they went. Robyn, like the other participants, was learning about the natural diversity of sex, gender, and sexual orientation:

> Much of the LeVay article was not surprising, even though there were many revelations included in the paper. After years of living with gay friends and family members, I am not shocked to read that there are measurable genetic and biologic differences between people who are gay and straight. (RJ-W)

Reflecting about this during IV-3, Mike and I remarked almost in unison during IV-3 that a student shouldn't have to wait until medical school to learn "the actual science."

Learning about or prior knowledge of the natural diversity of sex, gender, and sexual orientation supported the participants' commitments to and enactments of LGBTQ-inclusive praxis. All participants agreed with this during member checking.

Chemistry vs. life science. Throughout the study the TCs who were teaching chemistry felt that LGBTQ-curricular inclusion was more challenging in their discipline than in life science. Much of what they spoke of in terms of being LGBTQ-inclusive in chemistry centered on things they would avoid doing. For instance, Mike and Leo stated that they would not use gendered images of anions and cations. They described addressing bullying and interrupting LGBTQ-related bias in similar ways to Sara and Robyn. When speaking about opportunities in the life sciences, the candidates had many ideas about LGBTQ inclusion in their curriculum. For instance, Robyn's inclusion of same-sex partnered individuals in her heredity unit. Other ideas for LGBTQ inclusion in the life science curriculum which were not previously discussed included: teaching explicitly about the difference between sex and gender, a topic which permits the inclusion of transgender identities; teaching about intersex conditions in a manner to be sensitive to avoiding stigmatization of "abnormal" sexual phenotypes; discussions about how same-sex couples could have their own biological children *(e.g.,* female-female couples could with present technology, but male-male couples could not); teaching about the scientific understanding of what genetic and environmental factors contribute to sexual orientation; and teaching about the variation in animals' pairing behaviors *(e.g.,* same-sex pairings among birds).

The vacuum of existing LGBTQ-inclusive science curriculum. TCs are often quick to critique the curriculum materials at their disposal (Berson & Breault, 2000). In regards to LGBTQ inclusion curriculum, though, there is virtually no curriculum material to critique. Certainly, there were instances of heteronormative elements in the textbooks that were available in the classrooms (see Snyder & Broadway [2004] for a complete analysis), but there was *no* readily available LGBTQ-inclusive science curriculum available while this study was conducted. This made enacting LGBTQ-inclusive science understandably more challenging for the TC participants in the study. All of the participants remarked about this challenge throughout the study. The TCs developed many very interesting and solid ideas, but they expressed feeling that they lacked the time, resources, and expertise to develop LGBTQ-inclusive curriculum independently.

The power dynamic as a student teacher. All of the participants commented about the difficult power dynamic during their field placements. This was very clear in Mike's case as he struggled with how to respond to the LGBTQ-bias that his cooperating teacher was contributing to the classroom environment. Robyn noted when discussing overall supports and challenges to her commitments and enactments of LGBTQ-inclusive praxis that, "my position as a student teacher is challenging. There's a power dynamic there – it's not *my* classroom" (IV-3).

Participation in this study. All of the participants indicated that the extra time to reflect and discuss their experiences that was made available to them due to their participation in this study supported their commitments to and enactments of LGBTQ-inclusive praxis. This was not one of the original supports I had presented to the

participants during member-checking because it had not been written or stated in the documents, nor interviews, prior to the member-checking.

Phase III – Commitments and Enactments after the SEPP

Research about TCs often leaves off at the end of the SEPP. A fundamental question of this study, though, was how the participants' commitments to and enactments of LGBTQ-inclusive praxis manifested in their first year after the SEPP. This question reflects my grounding in STC theory. Transformation is a process that is socially mediated over time. In this study, I knew that my constant and close connection with the TC throughout the SEPP might create a dependency of sorts that could have linked LGBTQ-inclusive praxis to the SEPP. I worried that, as is the case for other reform efforts, these four TCs' good intentions and commitments might meet stagnation and disillusionment as they entered their first year of teaching. This induction period is widely recognized as a potentially tumultuous time for new teachers and a time in which idealistic transformative intentions may be extinguished by the realities of day-to-day classroom teaching (Simmons, Emory, Carter, Coker, Finnegan, Crockett, … Labuda, 1999).

Sara. Sara accepted a job as an eighth grade earth science teacher in a large urban school that housed grades 6 through 12. This meant Sara was teaching outside of her preferred context in two parameters – she had intended to teach high school and she preferred life science content. None-the-less, Sara was excited about the opportunity to work in a school in the city and close to her own home. Immediately, though, Sara experienced contextual challenges. Her class rosters were too large and her students were

unevenly distributed in the class periods she was teaching. Classroom leadership and management concerns trumped her first month of teaching as she sought support from me and other mentors.

When Sara and I were able to connect in-person towards the end of her first year teaching she indicated that she had not seen many "Safe Space" signs around her building though she had not been in very many of her colleagues classrooms. She reported that she had hung up the sign that she had received from me the year prior. She was aware that there was a GSA in her building, but though she had wanted to participate in it she had another weekly obligation that conflicted with the meeting times of the GSA.

Sara was not aware of any of her students' specific LGBTQ identities, but she had seen some of her students holding hands with people of their same gender around the school. She reported that she had not found ways to connect LGBTQ-identified people and/or topics to her earth science curriculum. She indicated, though, that LGBTQ people and topics relate to her classroom management as frequently as once every two weeks. She reported that most of this management focuses on intervening on students' misuse of the term "gay." At the time of this writing, Sara had been offered a contract to continue teaching at the same site the following year.

Leo. Leo was offered several science teaching positions at the end of the SEPP including a position at a prestigious private school. He decided to accept a full-time position with the company that he worked at during the SEPP. He told me that, "they made an offer I couldn't refuse." Leo also communicated that he had made it very clear to them that he would not be staying there longer than a year because his heart was totally

in teaching. I recall my heart sinking and my throat clenching when Leo told me his news. I strained to maintain my smile and assure him that his decision was completely his own and that I supported him, not his job, completely. In my mind, I returned to Fifield and Swain's narrative. Was history repeating? I hoped not. Leo was giving me a very different story about postponing teaching. Leo expressed no concerns about the intersections of his sexual orientation and teaching.

I had the opportunity to spend some additional time with Leo because he enrolled in a course I was teaching about equity, policy, and assessment in science education as Leo sought to complete the last few courses he needed to receive his Master's Degree in Education. Without any prompting from me, Leo selected LGBTQ topics for the focus of two of his major assignments in the course. The focus of one of those projects was planning a research study about teachers' perspectives about LGBTQ inclusion and teacher "outness" in K-12 schools. For the purpose of the class project, Leo received a similar amount of assistance from me as was provided to all of the other students. After the course was complete, though, Leo and I jointly refined the instrument for the study and passed it through our internal review process.

Robyn. Robyn assertively sought, was offered, and accepted her "dream job," a life science teaching position in the high school near her home in the city. She had communicated to me early on in the SEPP that she wanted to teach at that site. I visited Robyn in her school twice during her first year in practice. When I entered the room on my first visit, I immediately noticed that she had printed the "Safe Space Sign" I had made for her during the SEPP and was displaying it centrally at the front of her

classroom. She had plans to assist in the advising team for the GSA. During my second visit, on Valentine's Day, she told me, a boy had come into her classroom carrying a rose. He had walked to the back of her classroom and delivered it to a boy in her class. Not a single student remarked at all. She had to reprimand the student for entering her class while she was teaching, but she beamed as she expressed the beauty of how completely unremarkable the event had been. She had become active in advising the GSA. In her first year, Robyn was already well respected and regarded by her colleagues throughout her building for her commitment to differentiating her curriculum and creating a welcoming learning environment for her students.

However, when I asked Robyn about LGBTQ inclusion directly in her curriculum, she responded:

> I still don't feel like I am doing very many concrete things to be inclusive of LGBTQ issues in my curriculum. I would like more resources and definitely some sources of information about LGBTQ people in science (or other fields) so that I could put up pictures/quotes on my wall. The easiest place for me to feel like I'm being very direct is during the genetics unit… when I am teaching about genetics and inheritance I am very careful about the words that I choose. I am sensitive to all of my students who do not come from a typical mom/dad family structure. In [this class], we do not get past monohybrid crosses, and do not do family trees, so I did not spend as much time discussing same-sex partners, adoptions, and all of the other real-life family structures that don't show up in simple family trees/pedigrees.

Robyn did not feel she was as able to be as attentive to LGBTQ topics nor broader notions of diversity in families in her first year teaching due to the district's adoption of Focused Instructional Practice (FIP). Though she had already demonstrated the capacity to engage students deeply about gender and sexual diversity within her science curriculum the context of her school limited her praxis. At the time of this writing, Robyn was planning to return to the same position the following year.

Mike. Mike accepted a high school chemistry position in a suburb far enough away that I had not had the opportunity to stop-in and visit with him in his classroom. I connected with him over the phone in the fall to quickly check-in with him, but I picked up no details about how he might be navigating gender and sexual diversity. Stereotypically, I feared that the generally more socially conservative suburban context might stifle any LGBTQ-inclusive commitments Mike might have developed.

However, I received an email from Mike mid-year that interrupted my concern. The entire body of the message is included here:

> I had a situation happen today in school and I thought of you. I was having a meeting with some of my physical science colleagues (I teach Chemistry and Physical Science), on our next couple of weeks. We are beginning to talk about chemical reactions and so they were sharing what they have been doing in the past. They described this activity where students are involved in a soap opera drama where students represented elements in compounds. In this scenario, compounds are represented by male and female couples randomly selected in the room. To show single replacement reactions, either the male or female in the

> couple is replaced by a same sex counterpart (drama!). With double replacement reactions the males are replaced by the male from the other "compound" and the same with the females. I made the comment that it seemed pretty hetero-normative and I got a look as if everyone thought I was stirring the pot. The response was that I could change it up in my class if I wanted, but no further discussion came from my comment. The activity is dumb in the first place, so I'm not going to waste my time modifying it just so I can use it in my classroom. I just thought you'd like to hear about this since I was fairly skeptical that scenarios like this would happen to me while I was teaching science, let alone my first year.

I was somewhat surprised. Mike was interrupting heteronormativity in the chemistry curriculum of a large high school in a second ring suburb. Mike had also joined the school's equity committee. In closing, I view Mike's resistance and struggle with "accepting" the notion of creating LGBTQ-inclusive praxis early in the SEPP as a testament to the learning he was undergoing. At the time of this writing, Mike intended to return to the same school the following academic year.

Conclusions

This study attended to science teacher candidates' commitments to and enactments of LGBTQ-inclusive praxis and the supports and challenges associated with those as science TCs traversed the space between science learner and science teacher. The analysis in this study was informed by STC. STC guided both the learning activities in the SEPP and the attention that this study paid to the contexts in which the TCs were embedded.

The first research question focused on TCs commitments to LGBTQ-inclusive praxis. Answering that question prompted the development of the "Levels of Commitment to LGBTQ-inclusive Praxis" (see Table 4.2). Based on that framework, all of the TCs entered the SEPP with LGBTQ naïve commitments to LGBTQ-inclusive praxis. Although all of the candidates could identify people they knew who were not-straight (none identified knowing anyone who was transgender), they did not identify sexual orientation or gender identity as aspects of their future students that they might take into consideration as teachers. By the end of the SEPP, all of the TCs had developed LGBTQ dedicated commitments to LGBTQ-inclusive praxis. That is, they had made strong commitments to supporting LGBTQ-identified students based on their desire to improve students' health and learning outcomes; committed to enacting supports within their classrooms to create safe learning environments including directly managing student's behavior that was biased towards LGBTQ-identified people; and committed to developing LGBTQ inclusion in their own curriculum.

Commitments and promises may be easier for TCs to make as they imagine their future selves as teachers. For this reason, the second research question attended to in this study focused on the TCs enactments of LGBTQ-inclusive praxis. The enactments reported by several of the TCs during the SEPP included responding to biased language in their classrooms and planning lessons that included LGBTQ-related topics. One TC had participated in a school-wide event aimed at raising awareness about LGBT people. More importantly, though, two of the three TCs who taught in their own classrooms in the year following the SEPP identified several enactments of LGBTQ-inclusive praxis at

the classroom leadership level and provided some examples of LGBTQ-inclusive curriculum they had planned.

Analysis of the MTLEs in connection with the TCs' commitments and enactments suggests that the TCs' adoption of commitments to and enactments of LGBTQ-inclusive praxis were prompted by the SEPP. In Table 4.3, it is apparent that there was a general trend towards increasing levels of commitment throughout the SEPP. The data suggests that the MTLEs prompted greater commitments to LGBTQ-inclusive praxis, but that the transition to field placement experiences both in the fall and spring may have stymied those commitments. However, the design of this study limits my capacity to generalize and say that the design of the SEPP in which this study was embedded causally related to the adoption of LGBTQ-dedicated commitments to and enactments of LGBTQ-inclusive praxis. Even within the SEPP, methodologically, this study design does not permit me to distinguish between the praxis the TCs who participated in the study had versus the other TCs in the SEPP.

This study also identified supports and barriers that the TCs associated with their development of commitments to and enactments of LGBTQ-inclusive praxis. These supports included being enrolled in an SEPP that was attending to LGBTQ inclusion; the legitimization of LGBTQ-inclusive praxis within science education spaces; having a supportive cooperating teachers; having prior knowledge about gender and sexual diversity in nature; and, receiving additional support with LGBTQ-inclusion through participation in this study. Barriers that the TCs identified included a lack of existing curriculum that is LGBTQ-inclusive in the sciences and the power dynamic they

experienced as a guest in another teacher's classroom. Also, depending on the particulars of their own context, their field placements were either a support if it was LGBTQ tolerant or accepting or a barrier if it was LGBTQ invisible. The TCs who were teaching life science courses perceived that they had more opportunities to plan for LGBTQ-inclusive curriculum than those who were teaching chemistry courses.

Implications for the Science Educator Preparation Program

It is evident that the SEPP has developed some practices that may support science TCs development of LGBTQ-inclusive praxis. While many of the experiences that the TCs had in their common content courses and methods courses were helpful in supporting the development of LGBTQ-inclusive praxis, the primary weakness that the SEPP has some control over is the support that cooperating teachers provided TCs with in regards to LGBTQ inclusion. This could be accomplished by adding explicit expectations into the programs' communications with cooperating teachers about the importance of attending to gender and sexual diversity in education and the SEPP's commitment to ensuring that their TCs have the opportunity to develop their LGBTQ-inclusive practices. Offering resources or additional professional development opportunities focused on LGBTQ inclusion may benefit the cooperating teachers.

The SEPP should consider requiring that all TCs in their program demonstrate the ability to enact LGBTQ inclusion in both classroom leadership and curriculum planning. Such a requirement could be worked into assignments and classroom observation protocols used by the SEPP. Building in such a requirement would align with the new CAEP standards and ensure that every science TC had the opportunity to receive support

as they developed practices that they were unlikely to have seen modeled in their own science classes.

The SEPP should consider making additional resources and supports available to LGBTQ-identified TCs. This could be done by coordinating with other licensure areas to offer an optional resource group for TCs that would provide them with peers and mentors with whom to discuss the particular opportunities and challenges related to their identities. Topics for discussion could include, coming "out" to colleagues, families, and students; legal rights and processes for LGBTQ-identified people in the State; resources for LGBTQ-identified teachers; and, seeking supportive places to work.

In the long-term, the SEPP could work towards addressing the need for LGBTQ-inclusive curricular materials by gathering lesson plans that are LGBTQ-inclusive. These could come from exemplars developed by TCs in the SEPP, from science teachers in the community, and from on-line sources. Additionally, the SEPP could work with another department to develop a course that focused on sexual and gender diversity in the sciences. Such a course could remain optional and be worked into a time in the program in which TCs had fewer demands placed on them.

Discussion

This study suggests that the elements of curriculum and pedagogy utilized in the SEPP may be worth other SEPP's consideration as they seek to prepare their TCs for LGBTQ-inclusive praxis. These include LGBTQ-inclusion in common content courses, methods courses, and field placements; opportunities for TCs to reflect about their own identities and experiences related to gender and sexual orientation; reading and reflection

assignments that focus on gender and sexual diversity; opportunities to talk through scenarios that related to managing bias towards LGBTQ-identified students; guidance related to establishing LGBTQ-inclusive learning environments; analyzing curriculum materials for heteronormative representations; and, developing and sharing ideas for LGBTQ-inclusive curriculum with colleagues (see Chapter 3 for more detail about planning for LGBTQ-inclusive science teacher education).

Chapter 5: Realizing the Vision of LGBTQ Inclusion in Educator Preparation for Students, Schools, and Communities

This chapter summarizes the three studies presented in this thesis; addresses challenges to LGBTQ inclusion broadly; and, finally, discusses how the vision of lesbian, gay, bisexual, transgender, and queer (LGBTQ) inclusion may be pursued for the benefit of students, schools, and communities.

The Present Studies

The three studies presented here offer possibilities for educator preparation programs (EPPs) to further a vision of LGBTQ-inclusive teaching practices. They do so by offering glimpses into an EPP that is engaging in efforts to prepare teacher candidates (TCs) for equity-oriented educational practices that attend to many facets of student diversity including their gender and sexual identities. These efforts within this EPP had begun prior to the adoption of the new standards for educator preparation adopted by the Council for the Accreditation of Educator Preparation (CAEP) specifying sexual identification in addition to gender as characteristics of learners that TCs must be prepared to address in their teaching. At present, it is unclear how CAEP will evaluate EPPs efforts at addressing this aspect of student diversity.

The "Case Study of an LGBTQ-Inclusive Educator Preparation Program" ("EPP Study") provided a tool for considering LGBTQ inclusion in EPPs, the "Continuum of LGBTQ Inclusion in Educator Preparation Programs" (CIEPP). Though the use of the CIEPP needs further study before it may be regarded as a reliable or valid for research purposes, it may be useful to EPPs and/or individual teacher educators as they develop

and evaluate their own efforts at LGBTQ inclusion in their work. In the "EPP Study," the CIEPP assisted in understanding and clarifying how LGBTQ inclusion was occurring in different components of the EPP at different levels. While the EPP could be described as generally LGBTQ tolerant using the CIEPP, there were components of the EPP between the levels of LGBTQ invisible and LGBTQ tolerant. This suggested much room for development on the part of the EPP to more fully integrate LGBTQ inclusion across the elements of LGBTQ inclusion.

The strengths and challenges that participants in the study perceived suggested that the EPP develop policies of its own to promote understanding about the important of LGBTQ inclusion among its faculty and its partner schools and districts. Though some faculty felt very prepared for addressing LGBTQ topics within their work with TCs, there were others in need of assistance developing LGBTQ inclusion within their component of the program. Additionally, greater clarity in the EPPs policies could improve the opportunity for TCs to enact their own LGBTQ-inclusive curriculum during their field placements. Finally, a challenge that the EPP faced was meeting the demands of its recent redesign which had promoted two innovations regarded within the EPP as desirable, greater time for TCs in field placements and the adoption of the Educational Teacher Performance Assessment (EdTPA), but which some participants felt reduced the time available to deeply address other important issues such as LGBTQ inclusion.

Whereas the previous study by Sherwin and Jennings (2006) had surveyed EPPs broadly in regards to how they were preparing TCs for diversity of sexual orientation, the "EPP Study" examined a large EPP in detail. Similar to Sherwin and Jennings study, this

study could not connect descriptions about LGBTQ inclusion in the EPP to particular learning outcomes for the TCs in the program nor, most importantly, to outcomes for LGBTQ-identified students in those TCs classrooms. This study did include implications for future research about LGBTQ inclusion in EPPs. Primarily, that future research about LGBTQ inclusion in the near future may need to rely upon large numbers of respondents because the historic lack of policy demands for LGBTQ inclusion in EPPs may have resulted in less awareness of efforts at LGBTQ inclusion than other areas of human diversity that affect students learning in secondary schools such as race, special needs, language, class, and gender.

While the first study had empirically explored LGBTQ inclusion in a single EPP, the second study theoretically explored possibilities for LGBTQ inclusion in life science educator preparation. The broad and theoretical focus was prompted by a lack of scholarly work related to LGBTQ inclusion in this discipline. This study offers life science teacher educators ideas about incorporating LGBTQ topics in their curriculum. Many of the suggestions for addressing LGBTQ inclusion in programs that prepare life science TCs were incorporated into the third study.

The third study, "Science Teacher Candidates' Commitments to and Enactments of LGBTQ Inclusion" ("SEPP Study"), described the commitments to and enactments of LGBTQ-inclusive praxis TCs demonstrated during a science EPP (SEPP). The "SEPP Study" described how LGBTQ-related topics were addressed across the common content and methods courses that the science in a SEPP. This study provided glimpses into changes in the science TCs commitments to LGBTQ-inclusive praxis during the SEPP.

This study's design also sought evidence that the science TCs were enacting the LGBTQ-inclusive praxis that they had committed to. Three of the four science TCs in the study demonstrated LGBTQ-inclusive enactments either in their management of their learning environments, the curriculum that they planned, or both in their field placements. Elia and Eliason's Continuum of LGBTQ Inclusion was used as a framework to describe the contexts that each of the science TC in the study experienced in their coursework and field placements. While causal relationships between the commitments to and enactments of LGBTQ-inclusive praxis could not be demonstrated using the methodology employed in this study, this study suggested that the level of LGBTQ inclusion in coursework and field placements may influence science TCs enactments of LGBTQ-inclusive praxis. Additionally, this study gathered some evidence to suggest that the commitments to and enactments of LGBTQ-inclusive praxis that the TCs had demonstrated during the SEPP persisted beyond the conclusion of the SEPP.

The SEPP Study included implications for the SEPP based on the strengths and challenges experienced by the science TCs. For instance, the science TCs in the study had indicated that their cooperating teachers had played a significant role in either supporting or thwarting their efforts at enacting LGBTQ-inclusive praxis. Thus, decision-makers in the SEPP were urged to make its expectations for LGBTQ inclusion explicit in communications with cooperating teachers, require that all TCs demonstrate LGBTQ-inclusion, and offer professional development opportunities for cooperating teachers about LGBTQ-inclusion.

Neither the "EPP Study" nor the "SEPP Study" provided opportunity to specifically focus on how the TCs in the programs were prepared for the complexity of students' identities, nor, more precisely on how the program may have influenced TCs understanding of those identities. Crenshaw introduced the term "intersectionality" to address the multidimensionality of individual identities (1989). For instance, the needs of a white, middle-class gay-identified cisgender male from a Christian family who speaks English are likely different from the needs of an African, straight, transgender-identified female who is learning English and living in poverty and practicing Islam. Thus, the specifics of how teachers might address and plan for such students may also differ. There were specific instances in the data in which it was evident that the TCs were being asked to consider the idea of intersectionality in regards to their students. The practices used in the EPP were sensitive to the complexities of teaching real, diverse students. They went well beyond providing TCs with simple, technical solutions to working with LGBTQ-students. Prominent practices within the EPP and SEPP were the use of teacher identity self-study, reflection, and dialogic conversation which are aimed at preparing TCs for the complexities of teaching.

Revisiting the LGBTQ Acronym

While the studies described here have a great deal to contribute to the understanding of LGBTQ-inclusion in EPPs, I want to attend to the potential consequences of a methodological decision that I made early in this work. The studies presented here followed the example of other scholars by using the acronym "LGBTQ" to represent gender and sexual diversity (e.g., Elia & Eliason, 2010). I did this with full

knowledge that there were significant and important differences among the subgroups of those who might both fit into the label of "LGBTQ-identified people" and those who would not. For instance, outcomes for lesbian and/or gay students may be better than for bisexual and questioning students (Robinson & Espelage, 2011; 2012). Transgender adults and youth experience more violence than their cisgender lesbian, gay, and bisexual peers (Beemyn & Rankin, 2011). Additionally, there are some identities which could be included under the umbrella of gender and sexual diversity, such as individuals who identify as asexual and intersex, which do not fit within the LGBTQ label.

At the time this study began, the more generic sounding phrase gender and sexual diversity (GSD) was emerging in scholarly work. Meyer's book *Gender and Sexual Diversity in Schools* had been my first memorable experience with the phrase. I had perceived GSD as sounding too generic perhaps because, at the time, I was not yet accustomed to it. My adherence to LGBTQ felt more explicit that I was referring to a label applied to individuals who had traditionally been marginalized in educational settings based on their gender or sexual identities.

While analyzing the data that was the focus of these studies, it was evident that enumerating these identities in this manner had consequences on the methodology. For instance, in the SEPP Study it sometimes seemed that LGBTQ was being used by the TCs when lesbian and gay or, at best, lesbian, gay, and bisexual was intended. Similarly, there were only minor suggestions that the specific needs or experiences of individuals who identify as transgender were being addressed within the EPP Study (for instance, there was a single reading that explicitly addressed transgender perspectives, see Table

2.5). Similarly, I found evidence that at least one component in the EPP Study had addressed queer as an identity in the curriculum for the TCs.

The lack of evidence within the data does not necessarily suggest that the unique experiences of the subgroups encompassed in the LGBTQ label were not being addressed within the EPP, but, rather, that the construction of my interview questions and analytical tools had not provided mechanisms to understand that differentiation. The data used in the EPP Study and SEPP Study, does demonstrate that the participants refer to numerous other representations for gender and sexual diversity including "LGBT," "GLBT," and, simply, the term "queer" which seemed to have been being used as term that aimed at capturing non-straight identities broadly.

As another scholar concluded, exclusion may occur via inclusion (Pallotta-Chiarolli, 2014). Researchers studying LGBTQ-inclusion in EPPs, or perhaps better, GSD-inclusion in EPPs, will need to continue to exercise care as they consider which sexual and gender identities their work addresses. Perhaps more importantly, researchers ought to consider which identities their participants are not specifying as such omissions may suggest the edges of the participants' understanding, experience, and/or acceptance.

Realizing the Vision of LGBTQ Inclusion in Education Contexts Broadly

My own vision of LGBTQ inclusion is grounded in the desire that all students experience safe and welcoming school environments conducive to learning and thriving. When I began these studies, it was evident that LGBT-identified students were not experiencing those learning environments (Kosciw, *et al.*, 2010; Kosciw, *et al.*, 2012; Robinson & Espelage, 2011). The limited large-scale quantitative research available at

the time suggested that enumerated policies, the presence of gay-straight alliances, supportive educators, and LGBT-inclusive curriculum all contributed to improved health and educational outcomes for LGBT-identified students (Kosciw, *et al.*, 2010; Kosciw, *et al.*, 2012). Of these factors, LGBT-inclusive curriculum was the most influential. Theoretically, I reasoned that LGBT-inclusive curriculum subsumed some of the other factors as, presumably; LGBT-inclusive curriculum was unlikely to occur in classrooms without supportive educators in schools lacking enumerated policies.

We also now have research that suggests that outcomes for LGBT and questioning students may be related to variables beyond the scope of schools and, for that matter, any known variables educational researchers have been able to suggest and measure that relate to student health and academic achievement (Robinson & Espelage, 2012). The accumulating effects of very small hostile experiences in the lives of LGBT and questioning students, sometimes called microaggressions, may be responsible. These messages occur throughout our student's lives – in classrooms, in hallways, on social media, in commercials, and around their homes.

Although the contexts affecting our students' outcomes are clearly complex, I feel that teachers and schools have an important role to play in setting expectations for acceptable behavior. LGBTQ-inclusive practices, which I emphasize, address LGBTQ topics in a supportive and responsive manner, may contribute to the experiences of our LGBTQ-identified students immediately. Additionally, though it will be hard to demonstrate empirically, such practices may contribute to our societal expectation about what is acceptable in regards to the treatment of LGBTQ topics and people over the long-

term. Finally, we may find ways in which non-LGBTQ-identified students benefit from LGBTQ-inclusive curriculum.

The studies here focused on the role that EPPs and SEPPs may have on prompting TCs to develop LGBTQ-inclusive practices. This research is, thus, very limited in regards to its capacity to prompt LGBTQ inclusion in schools. TCs are not the only individuals in schools who will need preparation and support for LGBTQ inclusion to develop and become common in school contexts. Teacher educators will need to pursue what elements of professional development are needed to develop LGBTQ-inclusive practices among veteran teachers. Further, all of the professionals whom support the learning of our students will need to develop understanding of how LGBTQ inclusion relates to their work in education. These professionals include administrators, clerical workers, counselors, parent-liaisons, transportation specialists, facilities specialists, coaches, and nutrition services providers.

The demands to develop LGBTQ-inclusive curriculum and practices will, I predict, increasingly come from the students we educate themselves. Jennings (2005) and Budge, Snapp, Russel, & Moody (2013) have provided accounts of the role students' demands that teachers attend to gender and sexual diversity have had on teacher's practices. Families will also have an important role to play both in supporting and resisting LGBTQ inclusion in school contexts. Realizing the vision of LGBTQ inclusion in EPPs for the benefit of students, schools, and communities will require similar scholarly efforts across these other domains of secondary education.

Final Comment

I feel incredibly honored to have worked so closely with the participants in these studies. The participants in the "Case Study of an LGBTQ-Inclusive Educator Preparation Program" were all highly committed to the pursuit of the attainment of greater equity in the classrooms that their TCs would eventually enter as teachers. I am deeply grateful that they shared their efforts, successes, and challenges.

The science TCs, in particular persisted bravely in exploring and constructing new terrains in science classrooms was inspiring. While this study outlined that terrain, the study design did not capture the depth of emotion that the TCs brought to this work as they pursued changing the status quo in science teaching by developing LGBTQ-inclusive praxis.

The words of Freire (1998) resonate with me now:

> […] we must dare in order to say scientifically that we study, we learn, we teach, we know with our entire body. We do all these things with feeling, with emotion, with wishes, with fear, with doubts, with passion, and also with critical reasoning [...] We must dare as never to dichotomize cognition and emotion... We must dare so that we can continue to do so even when it is so much more materially advantageous to stop daring. (p. 3)

I hope these studies further the work of other teacher educators as they seek to make it better for LGBTQ-identified students and all of our learners such that each learner's full humanity may be honored and embraced in our classrooms.

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Appendix A: Rolling Stone Article Excerpts used for LGBT Inclusive Pilot Lesson

Selections from: http://www.rollingstone.com/politics/news/one-towns-war-on-gay-teens-20120202

Excerpt 1: The silence of adults was deafening. At Blaine High School, says alum Justin Anderson, "I would hear people calling people 'fags' all the time without it being addressed. Teachers just didn't respond." In Andover High School, when 10th-grader Sam Pinilla was pushed to the ground by three kids calling him a "faggot," he saw a teacher nearby who did nothing to stop the assault. At Anoka High School, a 10th-grade girl became so upset at being mocked as a "lesbo" and a "sinner" – in earshot of teachers – that she complained to an associate principal, who counseled her to "lay low"; the girl would later attempt suicide. At Anoka Middle School for the Arts, after Kyle Rooker was urinated upon from above in a boys' bathroom stall, an associate principal told him, "It was probably water." Jackson Middle School seventh-grader Dylon Frei was passed notes saying, "Get out of this town, fag"; when a teacher intercepted one such note, she simply threw it away.

Excerpt 2: I ask for a show of hands: How many of you feel safe at school? Of the 19 kids assembled, two raise their hands. The feeling of insecurity continues to reverberate particularly through the Anoka-Hennepin middle schools these days, in the wake of the district's ninth suicide. In May, Northdale Middle School's Jordan Yenor, a 14-year-old with no evident LGBT connection, took his life. Psychologist Cashen says that at Northdale Middle alone this school year, several students have been hospitalized for mental-health issues, and at least 14 more assessed for suicidal ideation; for a quarter of them, she says, "Sexual orientation was in the mix."

Excerpt 3: *Anoka-Hennepin staff, in the course of their professional duties, shall remain neutral on matters regarding sexual orientation including but not limited to student-led discussions.*

It quickly became known as the "neutrality" policy. No one could figure out what it meant. "What is 'neutral'?" asks instructor Merrick-Lockett. "Teachers are constantly asking, 'Do you think I could get in trouble for this? Could I get fired for that?' So a lot of teachers sidestep it. They don't want to deal with district backlash."

Excerpt 4: "You feel horrible about yourself," remembers Dylon. "Like, why do these kids hate me so much? And why won't anybody help me?" The following year, after Dylon was hit in the head with a binder and called "fag," the associate principal told Dylon that since there was no proof of the incident she could take no action. By contrast, Dylon and others saw how the same teachers who ignored anti-gay insults were quick to reprimand kids who uttered racial slurs. It further reinforced the message resonating throughout the district: Gay kids simply didn't deserve protection.

Excerpt 5: "Justin?" She could hear her own voice rising as she pounded harder, suddenly overtaken by a wild terror she couldn't name. "*Justin!*" she yelled. Tammy grabbed a screwdriver and loosened the doorknob. She pushed open the door. He was wearing his Anoka High School sweatpants and an old soccer shirt. His feet were dangling off the ground. Justin was hanging from the frame of his futon, which he'd taken out from under his mattress and stood upright in the corner of his room. Screaming, Tammy ran to hold him and recoiled at his cold skin. His limp body was grotesquely bloated – her baby – eyes closed, head lolling to the right, a dried smear of saliva trailing from the corner of his mouth. His cheeks were strafed with scratch marks, as though in his final moments he'd tried to claw his noose loose. He'd cinched the woven belt so tight that the mortician would have a hard time masking the imprint it left in the flesh above Justin's collar.

Excerpt 6: "Did you see her blow her brains out?"

"Did you pull the trigger for her?"

"What did it look like?"

"Was there brain all over the wall?"

"You should do it too. You should go blow your head off."

Sobbing, Brittany ran from the bus stop and into her mother's arms. Her mom called Jackson's guidance office to report the incident, but as before, nothing ever seemed to come of their complaints. Not after the Gelderts' Halloween lawn decorations were destroyed, and the boys on the bus asked, "How was the mess last night?" Not after Brittany told the associate principal about the mob of kids who pushed her down the hall and nearly into a trash can. Her name became Dyke, Queer, Faggot, Guy, Freak, Transvestite, Bitch, Cunt, Slut, Whore, Skank, Prostitute, Hooker. Brittany felt worn to a nub, exhausted from scanning for threat, stripped of emotional armor. In her journal, she wrote, "Brittany is dead."

Excerpt 7: Brittany was a low-voiced, stocky girl who dressed in baggy jeans and her dad's Marine Corps sweatshirts. By age 13, she'd been taunted as a "cunt" and "cock muncher" long before such words had made much sense. When she told administrators about the abuse, they were strangely unresponsive, even though bullying was a subject often discussed in school-board meetings. The district maintained a comprehensive five-page anti-bullying policy, and held diversity trainings on racial and gender sensitivity. Yet when it came to Brittany's harassment, school officials usually told her to ignore it, always glossing over the sexually charged insults. Like the time Brittany had complained about being called a "fat dyke": The school's principal, looking pained, had suggested Brittany prepare herself for the next round of teasing with snappy comebacks – "I can lose the weight, but you're stuck with your ugly face" – never acknowledging she had

been called a "dyke." As though that part was OK. As though the fact that Brittany was bisexual made her fair game.

Excerpt 8: Like Brittany, eighth-grader Samantha Johnson was a husky tomboy too, outgoing with a big smile and a silly streak to match Brittany's own. Sam was also bullied for her look – short hair, dark clothing, lack of girly affect – but she merrily shrugged off the abuse. When Sam's volleyball teammates' taunting got rough – barring her from the girls' locker room, yelling, "You're a guy!" – she simply stopped going to practice.

Appendix B: Exit Survey responses from LGBT Inclusive Pilot Lesson

PROMPT: Two things I learned in class today…

- I didn't specifically learn anything _new_ today, because I am well-informed on GLBTQ issues, particularly in the scope about education and the X issues.
- About inclusive curriculum- what it entails.
- Developing an inclusive curriculum in schools is the most effective way to affect/address/improve attitudes towards school for GLBT students.
- Suicide ideation is significantly higher in LGBT students.
- Ways to provide a better environment for fostering a healthy environment for GLBT students to be more comfortable.
- District policies are not very adaptable.
- Curriculum is not often designed to incorporate LGBT issues.
- LGBT = GLBT (you can flip the G and L)
- It was helpful to see the statistics of how GLBT students are effected.
- Students who identify as transgender had experienced thoughts of suicide at a much higher rate than students who identified as gay, lesbian or bisexual. Very surprised by that.
- Science teachers don't address GLBT issues at all (very rarely).
- I learned a tiny but about the process of switching genders (don't know much about transgender.)
- There are well established studies on LGBT curricula, even if it's not in science. I think of this as a modern issue, but there's quite a history with this (more than I know, at least.)
- GLBT students don't get much relevance in science courses.
- Intergender/transition
- I need to be aware of my school district's policy on harassment based on sexual orientation and how this affects my actions.
- The percentage of suicide for students nationally.
- The suicide rate is significantly higher for LGBT students than their counterparts.
- 6% of students with disabilities have been physically assaulted.
- Statistics about suicide
- Having an inclusive curriculum is the best thing we can do to make school safer for LGBT students.
- I learned that lots of evidence suggests biological basis for gay/lesbian.
- Learned about X school district policy.
- Students and teachers have protection w/ regards to bathroom facilities
- Importance of inclusive curriculum to support GLBT students.
- I'm amazed at the pervasiveness of physical abuse. I always knew that there

were certainly instances, but being as prevalent as the hard stats show is a little shocking.
- How bisexual students have the highest rate of suicide ideation.
- Large percentage of GLBT contemplate suicide.
- Support for GLBT students is weak and problems (suicide) are massive.
- Inclusive curriculum
- Schools actually have policies about what teachers should do in a GLBT harassment situation.
- About the ridiculous X policy.
- X has some big problems.

PROMPT: In class today I felt…
- Discouraged hearing about/reading some of the clips you handed out and how passive teachers/districts are/were towards harassment towards GLBT students.
- Disengaged. That we should have done more with the reading slip. It just felt like a scare tactic.
- Surprised by the high rates of suicide ideation
- Honestly, I was pretty tired so I wasn't as engaged as I should have been.
- Like I was very educated on the topic and able to share my experiences and knowledge with my group
- Perhaps equating certain words/language with bias isn't accurate?
- Curious as a I teacher I want to be better for my students, so I was curious about strategies I could use in the classroom to address LGBT issues.
- That this topic needs to be discussed more so that we (teachers) are prepared to help students in our classroom.
- A little uncomfortable at times because I have very strong beliefs and I was worried I might express them in a way that offended others or made others uncomfortable. I often stick my foot in my mouth so I have learned to be cautious around touchy subjects.
- Ok.
- A little uncomfortable just because I don't know how to help GLBT students and I can't fully identify my own position on the subject.
- Comfortable discussing, but uncomfortable about how exactly I would handle a harassment case.
- Depressed after reading my slip about a student hanging themselves didn't really know how it related to vision for education…
- Comfortable and reminded of my responsibilities and desire to advocate for students
- I was pondering whether this occurs in my classroom and I'm just not catching it.

- It was helpful to review relevant examples -- your story about 2 std's in homeroom.
- A bit unexperienced in this topic. I have only a few LGBT friends, none of whom are very close. Without that personal experience, I have nothing personal to tie it to, to get me riled up and truly passionate about this issue.
- Good opportunity to discuss a topic I am concerned about and want to be supportive of, but am not always sure how to address.
- This was an important topic that was good to discuss.
- Empowered to do more as an advocate for LGBT students.

PROMPT: I need to know/learn…

- What does an inclusive curriculum look like in the physical sciences?
- Different examples of policies implemented at districts and how they can and should be interpreted.
- I need to know my school dist. policy on this topic.
- How to use a curriculum in a novice students classroom.
- How I can address or include GLBT issues/topics in Chemistry.
- How to support, without alienating from the rest of the class.
- The skills to actually confront these issues in a classroom.
- What advisory group I could recommend to my students.
- How does a science biology teacher accurately educate about this issue?
- How to deal with bullying. I have no idea how to approach this and I feel that it's a very important topic but I feel that I have continually been told that this cannot be taught I will have to learn it on the job but I would really appreciate some role playing of both common and uncommon examples and different responses (a few good, a few not so good) I think more direct experience would really improve my comfort level which would improve my effectiveness.
- It would be useful to see a bullying policy that is an example since the only one I am most familiar with is the X, given the local focus.
- Just _more_ ways to include GLBTQ topics/discussion in my curriculum - Biology - more ideas - and in the other classes too?
- How to effectively adjust curriculum
- Ways to implement an inclusive curriculum into my biology classes that doesn't feel disjounted or like its only being mentioned/used b/c of some issue that has arose.
- Some more specific tactics that have been used to diffuse these situations in class in the heat of the moment.
- More about the science, biology, biotechnology, and chemistry of being GLBTQ so I can teach about it explicitly.
- Examples, conversation starters. I'm bad at this kind of stuff. How can I get better? Basically examples.

- What we as teachers are responsible for educating students on the topic.
- How to be inclusive in chemistry. I was at a loss, but I am very interested in this.

Appendix C: Interview Protocol for LGBTQ-Inclusive Educator Preparation Study

Interviewing in this study will be largely emergent and responsive. Thus, the specific prompts are guidelines based on the stated purpose of each interview. These initial prompts are meant to be preliminary and may be modified during the course of the interview.

The interview may be conducted over the course of several sessions based on the needs of the participant (i.e., their schedule or desire to collect more information prior to answering the questions.)

General protocol

Greeting: All interviews will begin with informal greetings, chatting, and general "checking-in" about the comfort of the participant. They will be asked if they would like anything to drink. They may have been brought a meal or snack.
Recording: All interviews will include a check-in about audio and/or video recording before the equipment is turned on.
Prompts: Each prompt will be followed with requests for more detail such as, "could you tell me more about that?" or, "oh, wow, how did you feel about that?" or, "what steps did you take afterwards?"
Open elicitation: Each interview will end with an open elicitation such as, "is there anything else you'd like to talk with me about right now?" There will be a pause for 30 or so seconds.
Closure: Each interview will then come to a close as the researcher turns off the recording equipment. The researcher will interact with the participant about the next step in the study at that time (scheduling, document retrieval, focus groups, and/or observations.)

Program understanding

Program coordinators, key program staff, and instructors will be invited to participate in this interview.
The purpose of this interview is to verify information regarding the participant's role in the program and gather information related to LGBTQ inclusion in the work they perform in the teacher education program.

Prompts:

- What is role or roles do you have in the teacher education program?
- How do you regard LGBTQ inclusion in teacher education?
    - If needed: That, is it important? Why or why not?
    - If needed: Does it have personal significance to you?
- How does LGBTQ inclusion relate to each of those roles?
- Has LGBTQ inclusion changed during your time in your roles in the teacher education program? How so?

- What policies do you know of that relate to LGBTQ-people or topics in the teacher education program as a whole?
    - If needed: Could you please provide specific examples?
    - If needed: Is there anything different in your particular program?
- What practices do you know of that relate to LGBTQ-people or topics in the teacher education program as a whole?
    - "Practices" may be different depending on the role of the participant.
        - Staff: there may not be a policy about TCs who identify themselves as LGBTQ, but there may be a "practice" about what to do in those cases
        - Program coordinators: there may not be a policy about removing TCs from classrooms where cooperating teachers are homophobic, but there may be a practice for doing so
        - Supervisors: there may not be a policy for intervening if a TC does not respond to homophobic remarks in the classroom, but they may do so in their practice
    - If needed, is there anything different in your particular program?
- What is the climate like for LGBTQ-identified TCs in the teacher education program as a whole?
    - If needed: How do you talk to TCs about supporting LGBTQ-identified colleagues?
    - If needed: Have you had LGBTQ-identified TCs "come out" to you?
        - Or to the cohort?
        - What were their experiences like?
    - If needed: Is there anything different in your particular program?
- How do you address LGBTQ-people or topics in your teaching? [RE: diversity curriculum]
    - If needed: What philosophy of education do you align your teaching with in terms of LGBTQ inclusion?
    - If needed: What assignments do you have related to LGBTQ people or topics?
    - If needed: What readings do you use related to LGBTQ people or topics?
    - If needed: How do you teach about the needs and/or experiences of LGBTQ-students or families in schools?
    - Why do you do it that way?
- How do you address classroom leadership regarding LGBTQ people?

    - If needed: How do you prepare candidates for responding to LGBTQ-related bullying or bias in the classroom?
    - Why do you do it that way?
- How do you address the teacher candidates' representations of LGBTQ-people or topics in <u>their own curriculum</u>? [RE: formal curriculum]
    - If needed: How do you present curriculum that is LGBTQ-inclusive in your discipline?
    - Why do you do it that way?
- What strengths do you believe the teacher education program has in terms of LGBTQ inclusion?
- What weaknesses do you believe the teacher education program has in terms of LGBTQ inclusion?
- [If appropriate] Could you send me your course syllabus or syllabi? And/or other materials we discussed today?
    - If yes: Great, I will follow-up about that.
    - If no: Could you explain why not?

Appendix D: Interview Protocol for Science Teacher Candidates' Commitments to and Enactments of LGBTQ Inclusion Study

Interviewing in this study will be emergent and responsive. Thus, the specific prompts are guidelines based on the stated purpose of each interview. These initial prompts are meant to be preliminary and may be modified during the course of the interview.

General protocol

Greeting: All interviews will begin with informal greetings, chatting, and general "checking-in" about the comfort of the participant. They will be asked if they would like anything to drink. They may be offered a snack.

Recording: All interviews will include a check-in about audio and/or video recording before the equipment is turned on.

Prompts: Each prompt will be followed with requests for more detail such as, "could you tell me more about that?" or, "oh, wow, how did you feel about that?" or, "what steps did you take afterwards?"

Context prompts: As a significant amount of time may have passed between events, contextual prompts may be used to help participants remember elements of their learning experiences.

Open elicitation: Each interview will end with an open elicitation such as, "is there anything else you'd like to talk with me about right now?" There will be a pause for 30 or so seconds.

Closure: Each interview will then come to a close as the researcher turns off the recording equipment. The researcher will interact with the participant about the next step in the study at that time (scheduling, document retrieval, focus groups, and/or observations.)

Interview 1 – preliminary

Participants will be invited to this preliminary interview.

The purpose of this interview is to build some rapport with and probe about their interests in being a teacher, their preliminary expectations about the program, and their thoughts about teaching life science and, in particular, diverse learners.

Possible prompts:

- What brought you to the decision to be a life science teacher?
- What do you perceive your students will be like?
    - If needed: what about diverse students?
- What are your expectations for your teacher education experiences?
    - What are you looking forward to?
    - What are you wary of (or concerned about)?
- What do you perceive will be challenging to you as a life science teacher?

Interview 2 – midpoint

Participants will be invited to this preliminary interview.

The purpose of this interview has three focuses – to explore the participants experiences in the gender and sexual orientation class [MTLE-I], explore the participants' experiences in the LBGTQ focused science methods class.

Focus: gender and sexual orientation class [MTLE-I]

Possible prompts:

- Please describe your […] class about schools and gender, gender expression, and sexual orientation.
    - If not addressed: And, what did you do in your [discussion group] related to that class?
- How did that class go for you?
    - If needed: Did you know anything about the topic before class?
    - If needed: Was there anything surprising or noteworthy about the class? (For instance, did you tell anyone outside of the program about the class? What did you mention?)
- Please describe your writing in the TISS for this class?
- How do you perceive that lesson and/or the TISS relates to you as a science teacher?

Post methods class specifically about LGBTQ-inclusive curriculum

Possible prompts:

- Please describe your methods class about LGBTQ-inclusive curriculum in science classrooms.
- How did that class go for you?
    - If needed: Did you know anything about the topic before class?
    - If needed: Was there anything surprising or noteworthy about the class? (For instance, did you tell anyone outside of the program about the class? What did you mention?)
- How do you perceive that lesson relates to you as a life science teacher?

Focus: student teaching school and classroom environment

Possible prompts:

- Please describe your student teaching placement.
    - If needed: prompt about student diversity, co-teacher, school culture, signs of LGBTQ-inclusivity around the classroom or school, student use of terms such as "fag" or "gay."
- How do you feel about this placement?

Interview 3 – final formal interview

Participants will be invited to participate in this interview based on their unique perspectives and voice as it informs the study.
This interview will be conducted after the participant has completed the requirements for their initial license.
The purpose of this interview is to understand the participants' thoughts about the program in regards to their preparation for LGBTQ-inclusive science teaching. This interview will also be a time in which the candidate reflects back on their experiences and documents from earlier in their preparation experience. This interview will thus vary somewhat from participant to participant.

Possible prompts:

- Now that it's done, how do you feel about your overall licensure experience?
- How did the program prepare you for your work with diverse learners?
    - If needed: prompt for student diversity of gender expression and/or sexual orientation
- Are there any experiences in the program related to student diversity of gender expression and/or sexual orientation which really stand out to you now?
- How did any of those experiences influence your work with students in the classroom during your spring placement?
    - If needed: Could you give a specific example of that? (prompt for as many as possible)
- Here's my preliminary analysis of the assignments and interviews that you and the other participants have shared with me. Remember, I believe that this is highly contextual and the analysis in no way is meant to judge you as a teacher. I think you are a great teacher regardless of this analysis.
    - Are you still comfortable with the pseudonym that you selected?
    - Does this analysis seem fair to you?
    - Do you have any comments or questions about the analysis?
    - Are you comfortable with the quotes that are shared here?
    - Do you have anything at this point that you have shared in this study that you would like me to remove from any analysis?
- Early on you said [quote from interview 1 or assignment] in regards to students. How do you feel about that now?
- In our second interview you mentioned, [quote from interview 2 or assignment], could you respond to that now?

Appendix E: Teacher Identity Self-Study Assignments

Note. The Teacher Identity Self-Study (TISS) assignments were compiled from course syllabi. They have been adapted to remove references to the specific name of the course. Details about where to submit assignments and their required format were removed. The responses to each of the 5 prompts detailed below from TISS-A, TISS-B, and TISS-C were limited to 3-6 pages in length.

TISS-A

Teacher Identity Self-Study: Prompt 1

This prompt is the only time you will be asked to reflect directly on your own schooling experiences before we turn to the social and cultural dynamics involved in today's schools. We would like you to locate yourself in the history of education in the United States and then adopt a critical perspective on how your educational autobiography was shaped by competing norms and ideals.

Part A: Educational Autobiography

Tell the story of you as a K-12 student. Rather than focusing on a chronological history, identify a few key experiences and describe them in depth. Be sure to address the following, as your experiences allow:

- Type of school(s) you attended (e.g. urban/suburban/rural; public/private/parochial; size; climate; socioeconomic and racial demographics of student body)
- Your orientation toward school (e.g. you were determined to earn a perfect GPA, you tried to avoid being noticed, or you resisted authority)

Part B: Reading the self

Now, take a critical perspective on your educational autobiography. Keeping in mind the key … we have explored so far…. Write a commentary on your autobiography that focuses on the following questions.

- How did specific ideological, political economic, and local contextual factors shape this student's schooling experiences?
- What sort of schooling experiences and curriculum did this student have access to?
- What might you expect to come easily to this student? What might be more difficult?
- What can these elements of ease and difficulty tell you about the norms and ideals being enacted through this student's schooling experiences?

Teacher Identity Self-Study: Prompt 2

For your second essay, you are asked to begin viewing yourself as an emerging teacher, or to make a role shift from student to teacher. Return to your response to TISS #1, and explore how your personal educational autobiography may shape what you believe about the purposes of schooling, students, and how they learn.

- What teaching philosophies were you exposed to as a K-12 student? As a learner, how did you respond to these various approaches to teaching?

Now take a moment and begin to sketch the contours of your own philosophy of teaching (see Tozer et al, p. 17):

- What will your goals be for your students? What are your reasons for identifying these particular goals?
- How will you achieve those goals? What are your reasons for identifying these particular methods?

Teacher Identity Self-Study: Prompt 3

CULTURAL AUTOBIOGRAPHY PROJECT

Cultural autobiography is a reflective, self-analytic portrait of your past and present, and how your own cultural journey may impact your teaching.

Think about your life experiences and answer the following questions:

1. How has race, ethnicity, religion, class, sexual orientation, gender, or disability affected your life?
2. What exposure have you had to other cultural groups?
3. Are there specific life experiences that you consider of significance in shaping your worldview? (You may include typical and/or exceptional events from your childhood, school years, religious life, and family life; memorable encounters with individuals of various backgrounds, etc.)
4. How does your cultural autobiography help or limit your understanding of racism and social injustice in the United States?
5. How might your cultural experience impact your teaching?

Cultural Autobiography GUIDELINES

- **There is no right or wrong answer for this paper. There is no ideological or political leaning that the instructors are looking for.**

- We are interested in seeing how you are able to reflect on and examine your own cultural assumptions, which is important to becoming an effective teacher in a multicultural environment.
- This project will be assessed on your effort to examine & depict your identity and to understand your cultural background/framework as an individual.

TISS-B

Teacher Identity Self-Study: Prompt 4

Part A:

Describe a specific time when you noticed your gender and/or sexual orientation influencing your schooling experience. How exactly did it become apparent that gender and/or sexual orientation mattered - in that moment?

Part B:

Take some time to analytically reflect on what you have observed so far in your practicum experiences with regard to how schools and the education professionals in them approach gender and diversity in sexual orientation. Then, drawing on these insights, discuss as specifically as possible, your own developing approach as a teacher to creating a classroom environment that is gender-fair and ensures that all students can flourish.

TISS-C

Teacher Identity Self-Study 5

Letter to a Young Teacher

Harvard-educated Jonathan Kozol abandoned the comforts of academia and went into one of Boston's poorest Black neighborhoods to become a fourth-grade teacher. After being fired for reading a Langston Hughes book of poetry that was not on the approved curriculum list, Kozol wrote his first non-fiction book , *Death at an Early Age: The Destruction of the Hearts and Minds of Negro Children in the Boston Public Schools* (1967), based on his teaching experiences in Roxbury, which won the National book Award. In another book *Letters to a Young Teacher* (2008), Kozol writes to a beginning teacher:

"'Start out tough and stick to the prescribed curriculum,' new teachers are too frequently advised. This, in my belief, is the worst possible advice. Establishing a chemistry of trust between the children and ourselves is a great deal more important than to charge into the

next three chapters of the social studies text or packaged reading system we have been provided: the same one that was used without success by previous instructors and to which the children are anesthetized by now. Entrap them first in fascination. Entrap them in a sense of merriment and hopeful expectations."

In this final Teacher Identity Self-Study (TISS), we invite you to write a letter to yourself—similarly a young teacher like the one Kozol corresponded with. Write this letter instead of a final exam. But like a final exam, we expect you to demonstrate the cumulative knowledge gathered from all the [assignments], [small group] discussions, and practicum experiences. Your letter should also reflect the [class] topics comprehensively. Write this letter knowing that you will be receiving and opening it at the end of your first year of teaching to reflect on how well you have met your own hopes and commitments. Your letter should be word-processed, double-spaced, and no more than five-pages long.

You earn points for this TISS by tackling the assessment scheme [**(…)**] below:

[(…)] In your letter, you will describe how you will define your first year of teaching in regards to **[class]** topics (30 points):

1. Negotiating the competing norms of US education (C1; 3 points)
2. Defining your philosophy of teaching (C2; 3 points)
3. Navigating the complex intersections of being human (C3; 3 points)
4. Maximizing culture's role in learning (C4; 3 points)
5. Piecing together the jigsaw of race, culture and education (C5; 3 points)
6. Knowing how to address gender inequities and sexual orientation in your classrooms (C6; 3 points)
7. Forming partnerships with families (C7; 3 points)
8. Developing your Culturally Relevant Pedagogy (C8; 3 points)
9. Growing your adaptive expertise and educational leadership (C9; 3 points)
10. Exhibiting agency in your school's culture and working with school personnel (C10; 3 points)

Appendix F: Reflective Journal Assignments

Note. The Reflective Journal Assignments (RJ) occurred in an online environment. All of the responses were visible to all members of the science cohort These prompts were adjusted to by changing their font, format, and color.

RJ-F

This Ning post should require between 45 minutes and an hour. Timing suggestions have been provided in brackets for your guidance.

1. Find a science lesson/activity/website with a k-12 educational focus related to biological sex in some manner that is heteronormative [15 minutes]. Share your material (scanned text, photo of book page, url, etc.). How is the material related to biological sex? How is it heteronormative? How could it be made inclusive of sexual diversity? Be as specific as you're able about the changes that could be made [15 minutes].

2. Respond to the posting of a peer who has not received a response. Check out their source material, critique, and suggestions. How might an LGBTQ youth be impacted by the original source? By the improved material? [20 minutes]

Optional. If you found a source which you thought exemplified LGBTQ inclusivity in science, please share it.

RJ-S

Novice teachers may experience high levels of confusion and cognitive dissonance as, "they quite suddenly are immersed in a context of contrasts" (Steffy, Wolfe, Pasch, and Enz, 2000, p. 30).

Let's focus in on how your idealism regarding creating LGBTQ inclusive learning opportunities in science is fitting in with the realities of your student teaching experiences. That is, how is challenging heteronormativity going for you now that you're in a more direct teaching role? Please respond to the following:

1. What are you finding easy about creating an LGBTQ inclusive science learning environment?

2. What are you finding challenging about creating an LGBTQ inclusive science learning environment?

3. Compare creating LGBTQ inclusive teaching practices to your work creating effective learning environments for students diverse along other axes (race, culture, religion, language, ability, economics, and so forth). That is, is it harder/easier? Why do you think so?

4. What additional support do you need to effectively teach science to LGBTQ students (or support their friends and families?)

5. What are your thoughts about the LeVay chapter? (Yeah, that's a very open ended question. Go with your "gut." A few sentences will be sufficient.)